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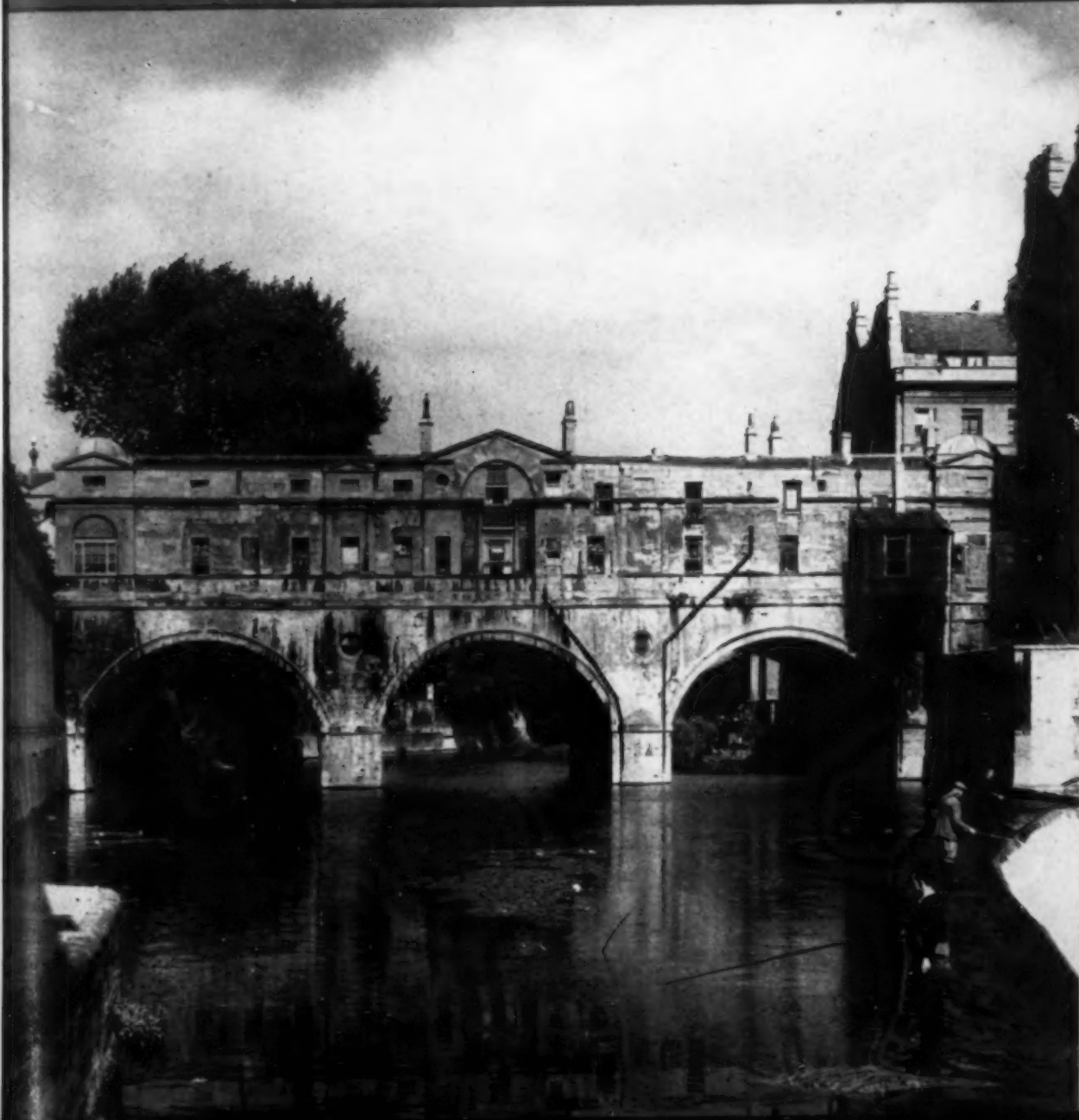
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CANADIAN GEOGRAPHICAL JOURNAL

Vol. XXXI • No. 2

AUGUST 1945

PRICE 35¢



S.S. "CABEDELO" SAILS FOR BRAZIL

97% Canadian materials . . . First ship built in Canada for Brazil leaves Canadian Vickers' shipyard



The S.S. "Cabedelo" is the first of several 4600-ton cargo vessels now under construction at Canadian Vickers' shipyard in Montreal, Canada, for Lloyd Brasileiro (Patrimonio Nacional). She sailed for Brazil a few days after Mlle. Hedwig, the daughter of Mr. Francisco Gualberto de Oliveira, Brazilian Consul in Montreal, raised the flag of Brazil to the mast-head in a short ceremony at Vickers' yard on July 21st.

The "Cabedelo", and the others being built, will form part of Brazil's maritime fleet, and will be used in coastal trade along the Brazilian coastline, for the transportation of food and supplies. Her holds are partly refrigerated. The vessel is 330 feet in length, with a 44-foot beam and a depth of 25 feet, and has a loaded speed of 11 knots. The "Cabedelo" was named for one of the Brazilian ships lost in this war through enemy action. Her sister ship, S.S. "Atalaia", is nearing completion.

CANADIAN **VICKERS** LIMITED

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MONTREAL, CANADA



Top: S.S. "Cabedelo" as she appeared just before the launching ceremony.

Centre: Finished and smart-looking in fresh new paint as she was being victualled and fueled for her maiden voyage.

Right: Launching ceremony. The ship is blessed before being christened and launched.



CANADIAN GEOGRAPHICAL JOURNAL

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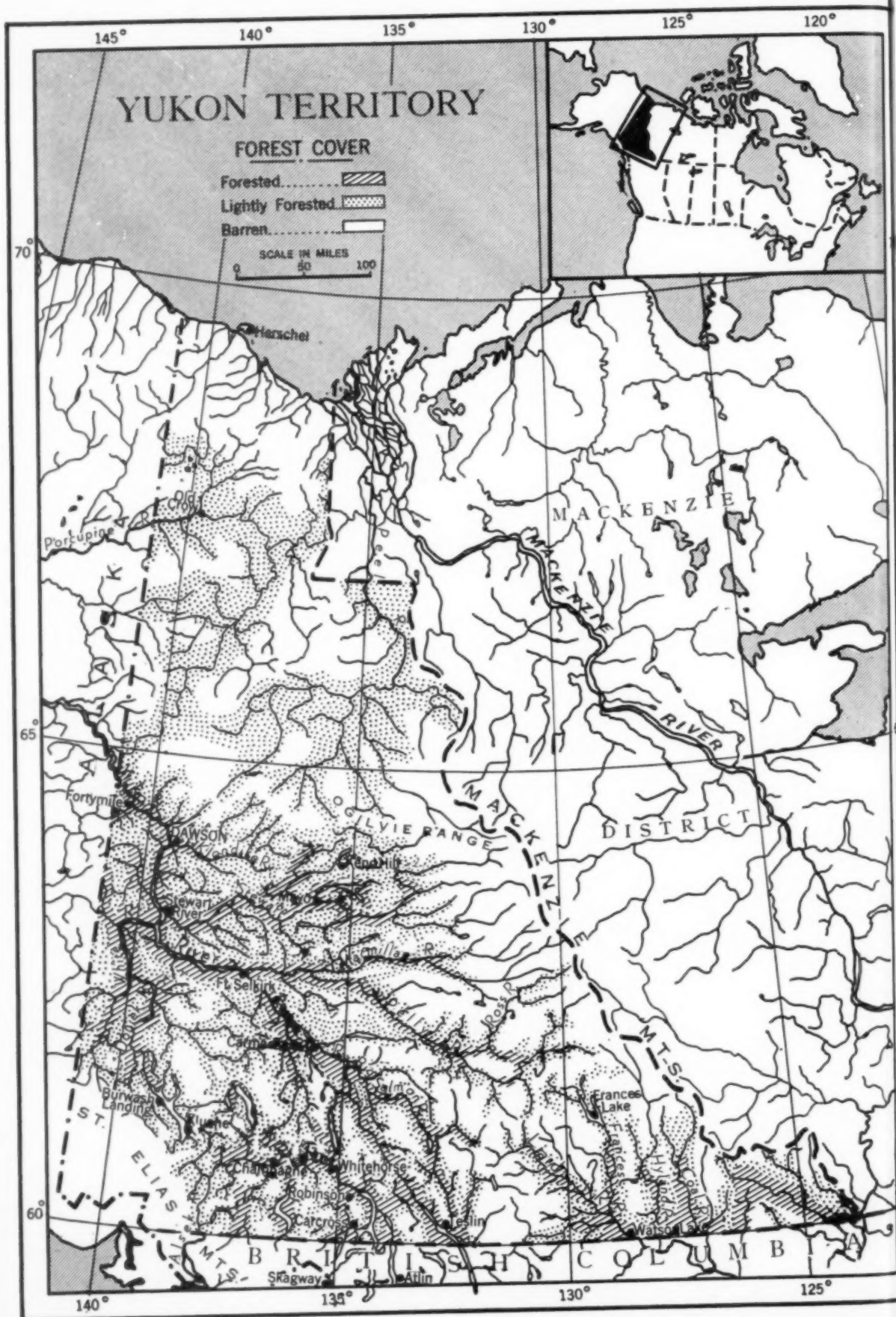
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Agriculture and Forests of Yukon Territory*

by J. LEWIS ROBINSON

THE ROMANCE and colour of the Yukon have often given Canadians certain misconceptions concerning the Northland. Growing interest in Northern Canada necessitates information about the location and extent of resources which will help to picture conditions there. Mineral resources will undoubtedly be the principal attraction for prospective residents, but behind this industry, and helping to maintain it, will be the resources of the soil. What the area can grow will be an important factor influencing the future settlement.

Certain geographic factors control the limits of agricultural development and forest growth. An assessment of these factors in Yukon Territory forms a background for discussions of future possibilities. It is doubtful if the Yukon could ever develop full-scale agriculture to a degree that it would compete successfully with imported products from more favourably located farming areas. It is also unlikely that the forest resources will ever support a forest industry similar to that of the provinces. Both are necessary and important, however, as local industries to complement the other activities of the region.

Agriculture in the Yukon developed at the beginning of the present century to supply food to the sudden influx of a mining population seeking wealth in "the land of the Klondike". Despite climatic hazards, general farming proved possible in certain favourable locations owing to the high prices paid for food. The early settlers found that the far northern latitude did not prevent the growing of field crops and vegetables during the long days of a short summer season. During the gold rush period farms were cleared in west central Yukon, totalling several thousand acres,

to supplement the large amount of imported food.

Yukon miners also found the hillsides and valley bottoms well covered by forests and utilized this resource to assist their mining developments. The forests were cut to become lumber for buildings and timber for mines; thousands of cords were used as fuelwood for the river steamers or were burned to thaw the permanently frozen ground for surface digging, before the present cold water thawing method was developed. Most of the timber resources of the local Dawson-Klondike area were exhausted during the early mining days, but the total forest reserves of the Yukon were more than adequate for the small population and remain to-day for future utilization.

After the peak of the mining boom, population in the Yukon gradually declined. Decreasing population was paralleled by an increased use of trucks and tractors replacing horses, and the market for locally grown grain and fodder became small. The abandonment of farms was accompanied, however, by an increased amount of gardening on the part of the local residents to supply part of their needs for fresh vegetables. At present, horticulture is almost a self-sustaining home industry. One of the factors which has discouraged agricultural development is the availability of country produce in the Yukon. While wild game can be shot, there is no incentive to raise cattle, and similarly wild fruits and berries are too plentiful to encourage their cultivation. These practices are possible when the population is small, but general farming will be needed to supply any increased population.

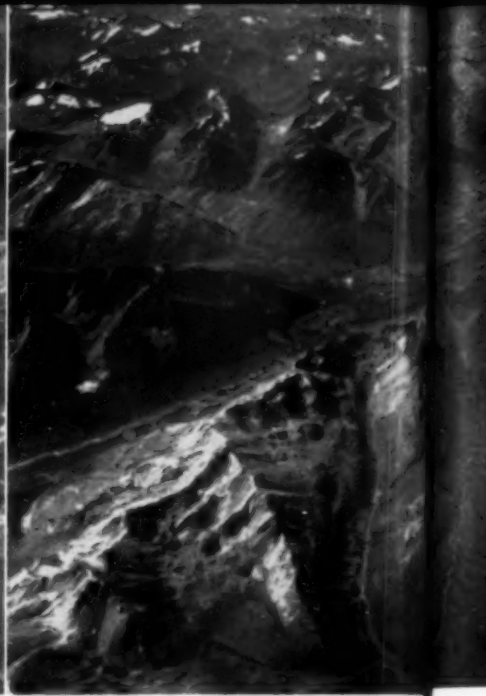
Physiography

The physical features of the Yukon are

*—Prepared at the Bureau of Northwest Territories and Yukon Affairs, Lands, Parks and Forests Branch, Department of Mines and Resources, Ottawa.



Looking southward over the Glenlyon Mountains and Pelly River, central Yukon.



The mountains of southeastern Yukon, northward.

controlling factors in limiting the areas which may have agricultural possibilities or support forest growth. The Territory is a region of hills and mountains separated by a network of large valleys. The main feature is the basin-like area called the Yukon Plateau, which has an average elevation of 2,000 to 2,500 feet, and is walled by higher mountains—the Ogilvie Range on the north, the Mackenzie Mountains to the east, and the St. Elias and Coast Ranges on the southwest. To the northwest the Plateau continues into Alaska. The area is drained by the broad Yukon River and its several tributaries, the Teslin, Lewes, Pelly, Stewart, White, and Klondike, all of which have incised themselves 1,000 to 1,500 feet below the main upland surface, and flow at this lower elevation in broad flat-bottomed valleys. Two smaller basin-like areas which are drained by the Porcupine and Peel Rivers lie to the north of the main plateau, and a third drained by the headwaters of the Liard River lies to the southeast.

The best known and most developed part of the Yukon is within the central plateau region.¹ It is an area of rolling uplands, the

summits of which show a uniformity of elevation. Isolated mountains and small ranges rise above the plateau level in places. Upstream from Dawson, the lower valleys of the main rivers spread out in a great branching system, which, in turn, drains similar large valleys occupied by small streams. The latter large tributary valleys have not been cut by the present small streams but are the result of erosion by glaciers or glacial streams during the last Ice Age.

An understanding of the main physiographic features and glacial history of the region is fundamental in discussing agricultural possibilities. The tributaries of the Yukon River rise in high mountains around the plateau and gather volume quickly, but when they reach the lower depressions, their gradients decrease and they flow peacefully through broad valleys. This factor has not only given Yukon an amazing network of branching navigable waterways, but has also meant that much level land is available for possible agriculture along the broad flood-plains of the rivers.

Physiography has also limited the amount of forest cover which has developed. Since

¹—Canada. Dept. of Mines and Resources. *The Yukon Territory*, Bureau of Northwest Territories and Yukon Affairs, Ottawa. 1944.



outhead, north of Frances Lake



Looking southward up the Donjek River, tributary of White River. The St. Elias Range in the background

most of the Yukon is mountainous or plateau-like, there are large areas of tundra above timber-line, which is at an altitude of about 5,000 feet in southern Yukon. There are also extensive sections supporting a growth so stunted that its chief value is as a cover for game or fur animals. Merchantable timber stands, except in the extreme south, are chiefly confined to the river and stream valleys where there is a combination of good soils, sheltered conditions and low elevations.

Climate

Climatically, the Yukon is probably less favoured than the lower-elevation valleys of the Mackenzie River system. Because of the generally higher elevations of the Yukon plateau, temperatures are lower in both winter and summer, although the valley bottoms may become quite hot during summer days. Average annual precipitation is light because of the interior position of the plateau which is cut off by mountains. Meteorological stations with long periods of record are few in the Yukon, thus climatic data on a regional basis are scanty. The figures available represent lowland conditions where general farming or gardening is

possible rather than the higher upland or mountain areas.

Mean monthly summer temperatures of 50 to 60 degrees are recorded at Dawson, Carcross, and Mayo, and mean daily maximum temperatures rise to 65 to 73 degrees on a monthly average during the summer. Shorter periods of records at Whitehorse, Frances Lake, and Watson Lake have similar averages. An extreme maximum of 95 degrees recorded at Dawson is the highest known in the Yukon. Average maximum temperatures during a summer month usually reach 80 to 85 degrees. Summers could thus be called cool, with occasional hot spells.

The Yukon Plateau near the Alaska boundary, along the Alaska Highway

R. C. A. F. photos



Mean monthly winter temperatures show greater variety, depending upon the location of the station. They range from 0 degrees in January at Carcross and Frances Lake to -13 degrees at Mayo and -21 degrees at Dawson in January. Extreme minimum temperatures of -67 degrees have been recorded at each of the three long-period climatic stations and monthly minimum temperatures, on the average, drop to around -50 degrees at most of the stations.

Average annual precipitation is low in the Yukon, ranging from 9 to 13 inches. It is more effective, however, than in areas farther south in Canada since lower temperatures result in less evaporation. About 35 to 50 per cent of this total falls during the four summer months. Because of the topographical barrier of the St. Elias and Coast Ranges, southern Yukon appears to receive less precipitation than the west central section. All stations record monthly averages of less than two inches of rainfall, which is a warning that agriculture may be a precarious industry in some years.

The average length of the frost-free period is a measure of the future agricultural possibilities that a region may have. Since there is a range of almost two months between the recorded dates of the earliest and latest fall frosts, it is apparent that this average period can be greatly extended or contracted in certain years, and therefore has its chief value for comparative purposes. Southern Yukon, with higher elevations, as illustrated by Carcross and Whitehorse, has an average frost-free period of only 45 days, while Dawson and Swede Creek, in central Yukon, have an average of 75 days. Average spring frosts occur in early June in west central Yukon and after mid-June in the southern areas. Average fall frosts are recorded around August 20 in the Dawson area, as compared with August 10 in the vicinity of Whitehorse. The first fall frost has always been recorded before September 15 at all Yukon stations. These data indicate that crops which mature in 70 to 75 days, and which can tolerate night

temperatures below 43 degrees Fahrenheit, have more chance of success.

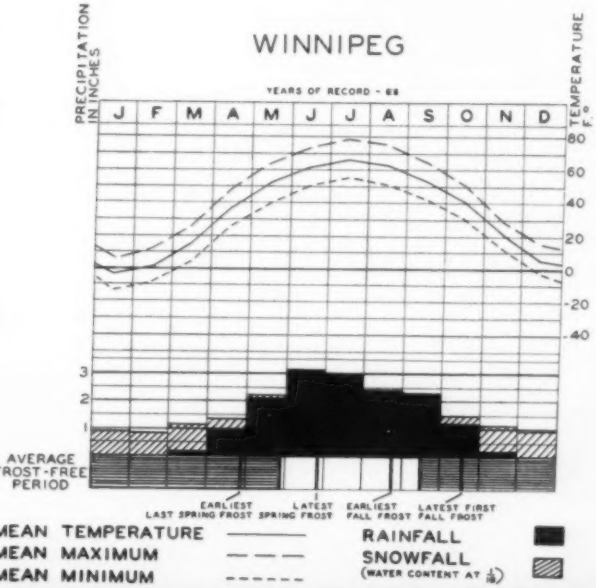
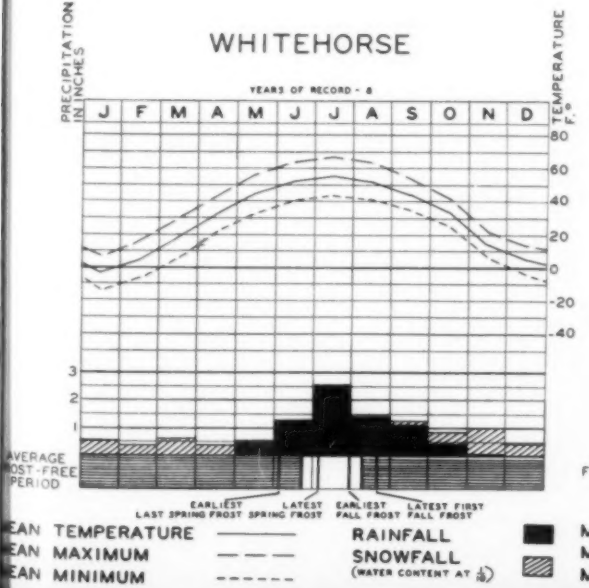
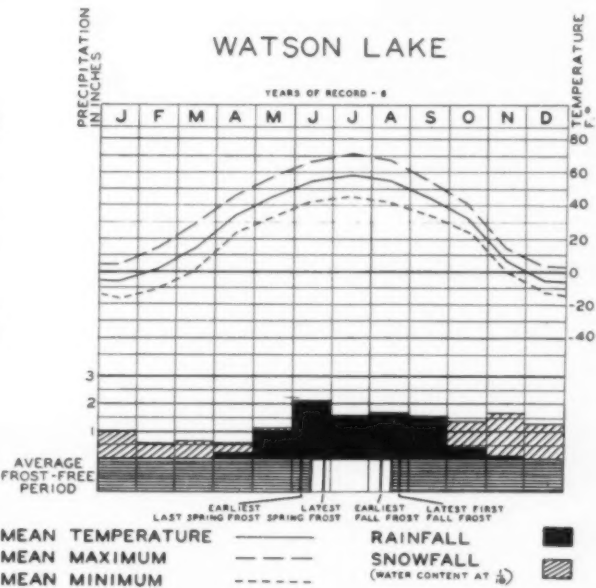
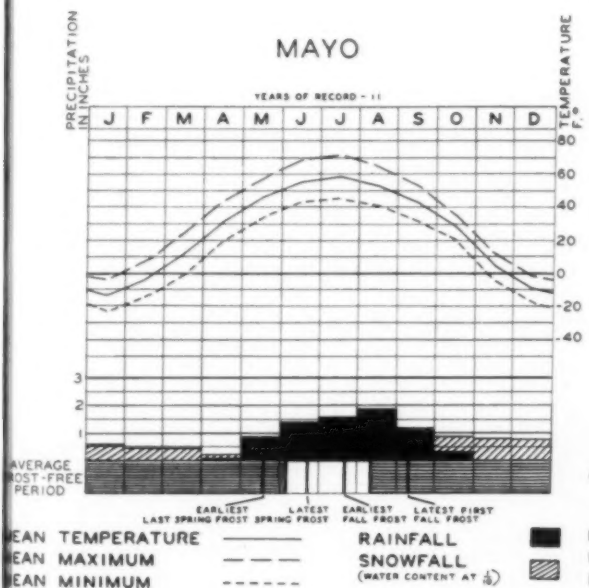
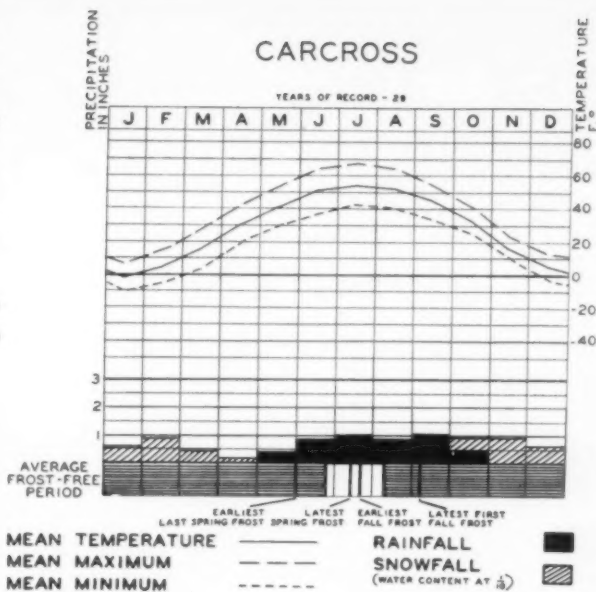
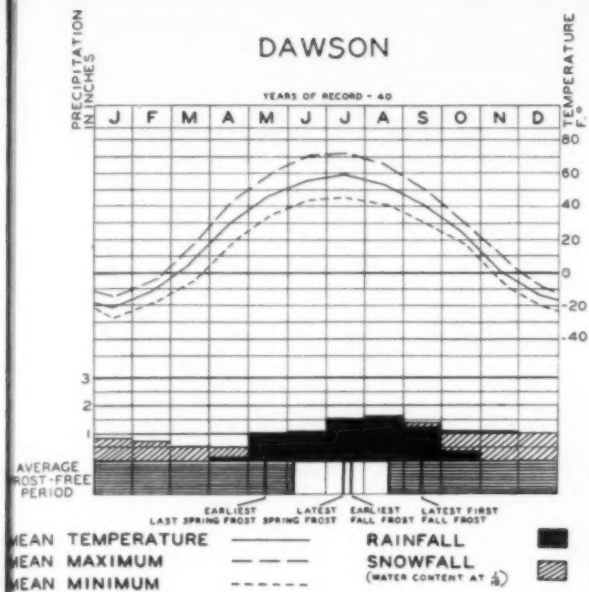
Soils

Soils are not deeply weathered in the Yukon since soil forming processes work slowly, owing to the small amount of rainfall received and the severity of climate. Although most of the agricultural soils are tree-covered, strangely enough they do not have the leached layer which is characteristic of wooded soils.

Reconnaissance surveys indicate that surface soils have two predominant colours which are illustrative of drainage conditions. The reddish-brown soils are well-drained, while black or dark grey soils are poorly drained. The soils are derived from a variety of rocks so it would appear that mineral plant food is sufficient. Soil tests show that organic matter tends to be on the low side for many soils with agricultural possibilities. The sandy, non-agricultural soils are decidedly acidic, and the better soils are slightly acid to alkaline in reaction. Under cultivation and cropping it has been found that yields on upland soils decreased rapidly after a few years unless fertilizer was added.

The soils considered as having agricultural possibilities in southern Yukon valleys are not classed as permanently frozen, although permanent frost has been found at a depth of 25 feet at the Whitehorse airport. In the Yukon Valley north of Carmacks, frozen soils are more common, especially on northern slopes. Around Dawson and Mayo even the lowlands and southern slopes have permanent frost within a few inches of the surface unless the land has been cleared or burned over. This zone of permanent frost, which is similar to that covering other large areas of Northern Canada and the northern Soviet Union, places additional difficulties in the way of agriculture.² Although it has been proved that crops can grow above permanently frozen ground, they do better if the soil is thawed to a depth of three to five feet.

²—Robinson, J. L. "Land Use Possibilities in Mackenzie District, N.W.T.," *Canadian Geographical Journal*, July, 1945.



Forests

South of latitude 64 degrees the Yukon is fairly well forested, although it is not rich in timber values. The southeastern section contains the largest portion of the forest resources and could supply a large amount of timber for other parts if it were needed. Central Yukon appears to have sufficient timber for present local needs and some limited future expansion. It is doubtful if any timber of commercial value occurs north of latitude 64 degrees but stands suitable for cabins and firewood are fairly well spread along the river bottoms. The northern Arctic Coast is a tundra area, beyond the northern limit of tree-growth.

In general, the forests belong to the Northern or Boreal Forest Region, and the most important timber species is white spruce.³ Black spruce is also widely distributed. There are, however, two species, alpine fir and lodgepole pine, which are commonly found in the forests of the Cordillera or western mountains, and which run through a considerable part of the Yukon.⁴

Our knowledge of the ranges of the various species of trees making up Yukon forests is as yet imperfect, but generalization is possible. White spruce is the only tree being used commercially to any extent. This species reaches its best development on rich river-bottom soils. It furnishes practically all of the lumber used locally and the bulk of the fuelwood supply for

both the river steamers and residents' homes. Black spruce occurs more commonly in the muskeg areas of southeastern Yukon, along the Canol Road, and in the muskegs of the Kluane Lake and White River regions of the southwest. The species is of no commercial importance since it seldom grows to a usable size in this region.

Alpine fir is fairly definitely limited to the central and eastern parts of the Yukon. Since it is a moisture-requiring species, much can be deduced concerning general climatic conditions by studying its occurrence within the Territory. Its westerly limit appears to be along a line drawn roughly from 40 miles east of Dawson, southeasterly to Tagish Lake.

The range of lodgepole pine is somewhat westward of that of alpine fir. It is the predominant species in the vicinity of Whitehorse, where it is used a great deal for firewood and in some places reaches sufficient size to furnish railroad ties. Other forest species which have been noted in local pure stands or in combinations with others are eastern larch, balsam poplar, aspen, and white birch.

Southern Yukon

Since soils and forests are indicative of what the land can produce, a regional summary of this information will illustrate some of the resource possibilities of the Yukon.

³—Halliday, W. E. D. *A Forest Classification for Canada*, Canada, Dept. of Mines and Resources, Forest Service Bulletin 89, 1937.
⁴—Raup, H. M. "Forests and Gardens Along the Alaska Highway", *Geographical Review*, January, 1945.

A broad, forested valley along the Canol Road, near Sheldon Lake, Yukon

U.S. Army photo



Looking southwest from south fork of Mackenzie River, black spruce in distance



The Liard watershed in southeastern Yukon and northern British Columbia contains the best timber found in the area. The river benches have soils of agricultural possibilities, but the cost of clearing would classify this area more economically as a future timber area. The best stands are in the valleys, but the uplands, up to an elevation of about 3,500 feet, also support timber of very good quality. Some of the merchantable stands west of Watson Lake are from 100 to 135 years old, and run from 15,000 to 30,000 board feet per acre. Forest fires have not been extensive or frequent in the area. The general rate of growth is reasonably good in the Liard watershed and it contains sufficient reserves of timber to furnish an exportable surplus to either Mackenzie District or Yukon in the event that transportation facilities make this feasible.

Farther west along the Alaska Highway there are merchantable stands of spruce in the vicinity of Teslin Lake and along the Nisutlin and Teslin Rivers. These stands also extend into the uplands to elevations of approximately 3,500 feet. Because the climate is drier this area has suffered more from fire, and timber is not as large or extensive as in the Liard watershed. Stands of spruce of good quality are typical of the bottom lands, and lodgepole pine in pure, or almost pure, stands is found on the uplands.

Soil surveys indicate that there is some good soil near the north end of Teslin Lake which might be suitable for gardening, and would also make good grazing land. Open meadows are common, and wet meadows are conspicuous along drainage channels. Soils and vegetation indicate that the area is too dry for agriculture, but there would appear to be an abundance of native forage which would cure well to winter live stock.

There are soils at the north end of Tagish and Little Atlin Lakes which, while not first class, are possible farm lands. Tagish flats have about 6,000 acres of mixed soils of a generally heavy texture. The vegetative cover varies from open grassland to dense spruce stands, suggesting a diversity of soils, some of which are good, but all appear to have a poorly drained subsoil. By using the criteria of soils and vegetation to determine proper land use in this area, it would seem that subsistence farming, utilizing the grazing lands and local woodlots, would be possible for a small-scale beginning.

Northward along the Canol Road tree growth is generally small. Limited areas of merchantable timber are found along some side creeks, and also at Quiet Lake, Lappie River, and Sheldon Lake. United States contractors had portable sawmills at the latter two locations during the construction of the Canol pipeline and road, and cut one million board feet of lumber, 144,000 linear

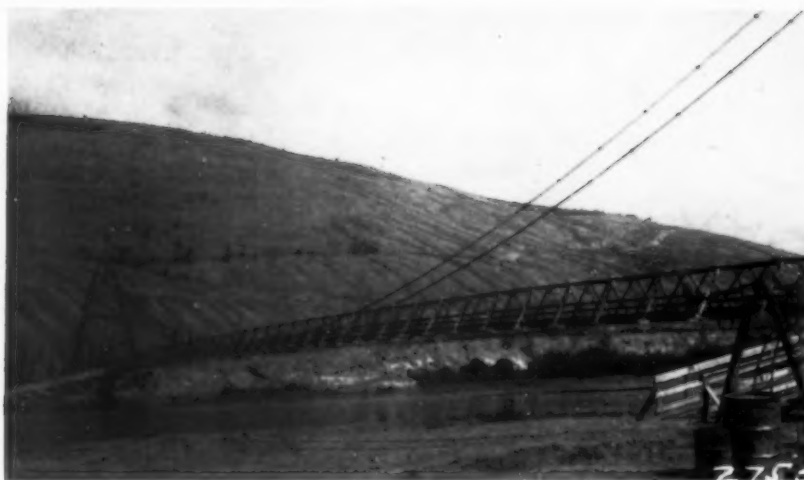
towards Mount Sheldon. Burnt over area

Photo by F. H. R. Jackson

Plateau surface and sharp peaks of the western sections of the Mackenzie Mountains. Sheldon Lake and Mount Sheldon in the centre background

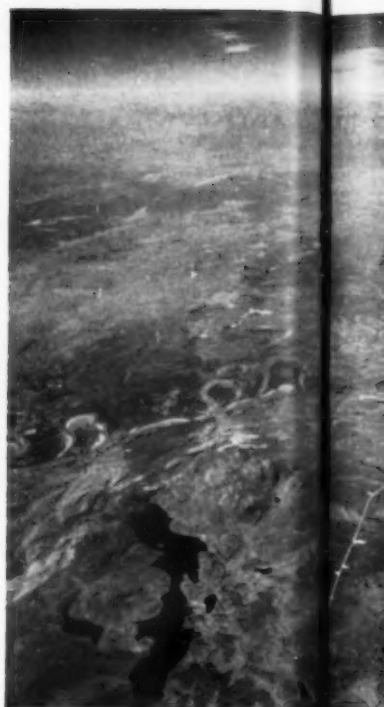
R. C. A. F. photo





The Canol Road crossing over Pelly River near Ross River post. Note the bare hillsides burnt over twenty years ago.

Photo by F. H. R. Jackson



feet for telephone poles, and 3,000 cords of dry fuelwood. With lumber needs for the Canol Road now fulfilled, it is doubtful if there will be any market for the smaller trees found in the river valleys along the road.

In the Carcross area, south of Whitehorse, land use possibilities are limited by sandy soils, dry climate and unfavourable topography. Open range is plentiful but arable hayland is less common. For some time cattle and horses have grazed and overwintered here with little or no supplementary feed. Some farming on a few acres has been carried on at the Carcross Anglican Mission. There is adequate timber in the Whitehorse-Carcross area for domestic fuelwood supplies using seasoned pine, but hardly enough for any extensive lumber industry, and the danger from forest fires is always a hazard.

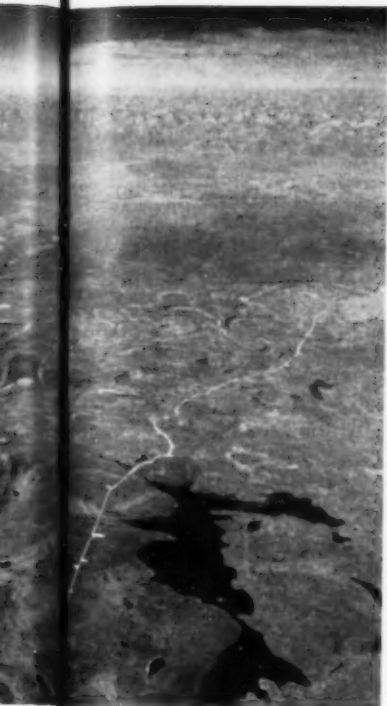
The largest continuous block of potential agricultural land lies in the Takhini-Dezadeash Valleys, west of Whitehorse. The two drainage systems form one valley about three to four miles wide and 100 miles long. Topography is generally level to gently rolling, sloping slightly to the south where the major streams flow. The eastern end of the valley is slightly more rolling, with a sand dune area found near Champagne. Average altitudes of the valley are about 2,200 to 2,400 feet above sea-level.

The valleys were probably once occupied by two post-glacial lakes, which deposited layers of clay in the central sections while

sand and gravel beaches accumulated near their edges. When the lakes finally disappeared, the present drainage system cut through the lacustrine deposition and laid its own clays and silts along the modern river flats. Thus the most mature soils are now found on the uplands and are generally stone-free and of good quality. They cover about two-thirds of the valley and are potentially general farming soils. The immature clays and sands of the lower benches near the rivers have grazing possibilities. Samples of soil taken under bunch grass in burned over areas have the appearance of a dark brown prairie soil, similar to that found in the Prairie Provinces.

The vegetation of the valley has a park-like appearance. Spruce, either in solid stands or clumps, occupies more than half of it, and aspen poplar, willow, and open grassy areas cover the remainder. Areas will have to be cleared for extensive farming, but this would not be as costly as in some other parts of the Yukon.

The greatest danger to future agricultural development in the Takhini-Dezadeash area will probably be the dry climate resulting from the position of the valley in the leeward of the high mountains of south-western Yukon. It is possible, however,



A dense stand of small black spruce, found along the Canol Road at Ross River.

Photo by F. H. R. Jackson

Left:—Looking southward over the Ross River Valley and the Canol Road. Note the broad valley and small stream.

R. C. A. F. photo

that moisture-bearing winds reach the valley from the Pacific through the Alsek gap in the St. Elias Mountains. There is an additional hazard from late spring and early fall frosts because of its plateau altitude. Agriculture has never been attempted in the area despite the proximity of a large market at Whitehorse. With these facts in mind, in 1944 the Dominion Experimental Farms Service selected a site for an agricultural sub-station at Pine Creek, near the junction of the Haines cut-off road with the Alaska Highway, and will begin operations there this year. The results obtained at the sub-station will be watched with interest as bearing on the future possibilities of the extensive area.

In the area around Kluane Lake and the headwaters of White River, the permanent frost zone is near the surface impeding drainage and restricting forest growth. White spruce and balsam poplar are the only species much in evidence; the former occupies the lower levels and the latter forms generally pure stands of stunted trees at the timber line. The scenic mountains and snowfields of this rugged region, which contains the highest peaks in Canada, form a real tourist attraction,⁵ and an area of some 30,000 square miles was set aside in

1943 for consideration as a National Park. The characteristics which give scenic grandeur to the area at the same time limit the soil and vegetative resources. In reserving the region as a game sanctuary and National Park, however, its only known resources are being protected and utilized.

Central Yukon

There are no outstanding timber areas along the Yukon River trench between Whitehorse and Dawson. The bottomlands and valley sides, however, are fairly well wooded except on the rocky hills at Lake Laberge. Spruce timber of any appreciable size is confined to the various tributary creeks and side draws. Beyond the junction of the Stewart River, growth appears to be more vigorous owing to more alluvial soil areas and greater precipitation. These stands have their chief value as a source of fuelwood for the river steamers. The forests along the river appear to be fairly adequate to maintain this supply, if traffic does not greatly increase. Population is sparse along the river between the two chief towns, and there is little direct land utilization. The forest cover serves its chief purpose in providing protection for the game and fur animals upon which the white and Indian trappers depend for a livelihood.

Between Carmacks and Dawson, potential agricultural areas are confined to local

⁵—Kitto, F. H. *Yukon, Land of the Klondike*, Dept. of Interior, Northwest Territories and Yukon Branch, Ottawa, 1930.



A flat-bottomed, glacial valley along the Ross River on the Canol Road.

U.S. Army photo

terraces composed of fine sands with heavier sections of silt and clay, and to river flats and islands covered with fertile silts. There is considerable grazing land near Carmacks, but further clearing of the good soils will be necessary to develop agricultural areas. The river flats along the Pelly River, which joins the Lewes from the east at Selkirk, appear to have fertile soils varying from sandy loam to silt loam overlying gravel. Agriculture in the Pelly River area, however, is largely a matter of economics, the chief problem being accessibility to local markets.

North of White and Stewart Rivers the benches and islands in the Yukon River become more numerous. Many of these areas used to be farmed before the decline in population in the Dawson locality,⁶ so it is known that the soils have good agricultural possibilities. There is additional agricultural land on the gentle slopes of the hills around Dawson. Soils range from a fine sandy loam to a loam and, where affected by seepage, are dark coloured. There are about 2,000 to 4,000 acres of tillable land on the slopes, of which probably 300 to 500 acres were once cultivated in productive farms. The future use of land in the Dawson area is hindered less by climate and topography than by lack of consistent local markets and competition from imported food stuffs. Expansion will greatly depend upon the development of other resources or facilities.

⁶Ogilvie, Wm. *Early Days of the Yukon*, Ottawa, 1913.

The low rounded hills and flat-bottomed valleys around Dawson are sparsely timbered. Trees rarely exceed six to eight inches in diameter except in favoured locations. The sawmills which operated there during the mining boom exhausted most of the nearby lumber supply, leaving few areas readily accessible to Dawson which support a tree growth suitable for the cutting of fuelwood on a commercial basis. Most of the logs are now rafted down from the Klondike and its tributaries, and also down the Yukon and Stewart Rivers. There is timber on the west side of the Yukon River near Dawson, but this wood cannot be hauled across until the river ice is safe for travel in January, and this causes inconvenience if local reserves are not large enough.

The Stewart River Valley is well forested, but merchantable stands are not frequent partially due to the irregular width of the valley. Low areas of swampland and muskeg occur in the wide sections. Higher slope elevations (1,650 to 3,000 feet) support pure and mixed stands of spruce and poplar. The chief timber areas are on the alluvial lands of the lower reaches of the small tributary streams, the islands, and narrow strips along the river banks.

The volume of timber cut along the Stewart River has declined since the steamboats curtailed their period of operation. Fuelwood is still cut in a few small

Sub-alpine
white spruce
river narrow
Pass
Photo by

camp, however, to be rafted downstream to Stewart settlement to supplement supplies required for the Yukon river boats. Prior to 1940 the Treadwell-Yukon Mining Corporation cut timber from Mayo Lake for many years without disturbing the total stand to any appreciable amount, and it is probable that there is enough scattered timber along the Stewart River and its tributaries to assist any future mining development. Although the two Mayo sawmills were once busy, using logs from above the town, they now each turn out only about 100,000 board feet annually, most of which is shipped to Dawson or Whitehorse. The Mayo area requires about 3,000 cords of fuelwood annually when the mining camps are active, but about 500 cords are sufficient for the local residents.

Good agricultural soils are found on river flats along the Stewart River between McQuesten and Mayo, but most of them are fairly heavily covered with spruce. In addition to the necessity of clearing sections, the agricultural possibilities of the Stewart Valley are further limited by the shallow depth of unfrozen soil. The silt soils of the Mayo Basin are excellent for gardens, however, and the town is able to supply most of its own vegetable needs. At present the Mayo-Keno area is primarily a mining region,⁷ and the soil and forest resources are of less importance but are utilized for local gardening and lumber supplies.

Experimental Work and Field Investigations

The geographic factors of the Yukon have enabled the region to maintain an adequate forest growth and also permitted general farming when markets were available. An estimate of future possibilities can be based upon the results of past experimental work and present field investigations. Co-operative agricultural trials have been conducted since 1915 at various places in the Yukon by the Dominion Experimental Farms Service. Experimental work done from 1917 to 1925 at Swede Creek, on slope land seven miles west of Dawson, illustrated certain facts concerning agricultural possibilities in the Dawson area. Good crops of wheat, oats and barley matured in most years, but occasionally early frosts made it desirable to harvest these crops as cereal hay. Experimental work with forage crops showed that timothy and alfalfa were reasonably successful although alfalfa did not produce seed. Red clover was usually winter-killed. Brome grass was proved to be the most successful tame grass and at present occupies most of the farm acreage in Yukon Territory.

Further experimental trials at Carmacks (1932-34) and Carcross (1936-38) resulted in successful garden crops of most root and leaf vegetables. Grasses, clovers, and cereals had varying success, with summer frosts proving to be a serious hazard. The numerous other duties of the co-operator

⁷—Bostock, H. S. *Mining Industry of Yukon, 1939 and 1940*, Canada, Dept. of Mines & Resources, Mines and Geology Branch, Geological Survey Memoir 234, Ottawa, 1941.

Sub-alpine growth of white spruce on Ross River near Lappie Pass

Photo by F.H.R. Jackson



Good forest growth
along Little Ranch-
eria River, southwest-
ern Yukon



at the Carcross Anglican Mission resulted in discontinuance of the experimental work in 1938.

No further experimental work was attempted in the Yukon until 1945. The small population was mainly concerned with mining activity, and their local gardens and a few farms supplied most of their own needs. Wartime activity, however, brought new life to the Yukon. Construction of a line of air-fields leading to Alaska, the Alaska Military Highway and the Canol Pipeline brought a great influx of people. As part of the programme of field work, which is being undertaken to obtain more accurate knowledge of the possibilities of northern Canadian resources, Dr. A. Leahey, Senior Soil Scientist with the Experimental Farms Services, was sent north in 1943 on the recommendation of the Interdepartmental Committee on Agriculture for North-western Canada.⁸ Leahey conducted a broad reconnaissance soil survey of the northwestern regions in the company of Dr. V. C. Brink of the University of British Columbia, who studied grazing possibilities. As a result of this field work, which was

supplemented by a further short visit in 1944 to pick a site for an Experimental Sub-Station, certain generalized information is available concerning soil conditions and agricultural possibilities in the Yukon.

The forest resources of the Yukon and Alaska Highway were investigated by officers of the Lands, Parks and Forests Branch during the summer seasons of 1943 and 1944. General reconnaissance work was carried on by H. L. Holman of the Dominion Forest Service by car, boat and plane in south and central Yukon during 1943, and further studies were conducted in 1944 in the Mayo area and along the southern part of the Canol Road by F. H. R. Jackson, of the National Parks Branch.

Present-day Agriculture

As would be expected, farms are not large in the Yukon. Of the 26 farms, totalling 2,781 acres, listed in 1941, only two were larger than 300 acres (not necessarily cultivated), while the rest were under 200 acres, and one-third of the total farms were less than 50 acres in area. The 26 farms were all run by owners and none were

⁸—This Committee was formed in February, 1943, and comprises representatives of the Departments of Agriculture and Mines and Resources, under the chairmanship of Dr. E. S. Archibald, Director of the Experimental Farms Service.

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AGRICULTURE AND FORESTS OF YUKON TERRITORY

rented. The farms were classified as follows:

Grains and hay	5
Potatoes, roots and other field crops	6
Vegetables, fruit, nursery	3
Live stock	2
Subsistence	3
Part-time	6
Mixed farming	1

Most of the general farms are planted predominately in brome grass for hay. Yields vary from one to two tons per acre, but amounts decline unless the stand is rejuvenated. In addition there are smaller areas of wheat, oats, barley, alfalfa and potatoes. Farm income is derived chiefly from the local market for milk, butter and beef. Grain crops are usually grown for green feed, although they will ripen in all but unusual years of early frost. For comparative purposes, it is interesting to note the kinds and amounts of crops grown in the Yukon in 1931 and 1941:

	1941	1931
Cultivated area	511	778
Oats	27	63
Wheat	0	8
Cereals for hay	44	72
Cultivated hay	392	558
Other forage crops	0	3
Potatoes	47	69
Field roots	1	5

The minor importance of present agriculture in the Yukon, and its decline, is further illustrated by the following statistics:

	1941	1931
Total farm value	\$85,440	\$127,459
Area in acres	2,781	5,197
Area under crops	511	778
Number of farms	26	41
Farm population	42	74
Number of horses	90	62
cattle	52	72
swine	72	41
chickens	138	224

Open grassy valley and forested slopes on the divide between Nisutlin and Teslin Rivers

Photo by F. H. R. Jackson

A Canol Road bridge over Teslin River. Forest growth is not dense.

Forest cover near Watson Lake. United States Army Engineers bridge

U.S. Army photo





Above:—The wide, gravel flood-plain of Duke River, draining the St. Elias Mountains near the Alaska boundary.



Although gardening is at present well established in the Yukon, general farming is in poor condition. The better soils and more favourable climate appear to be in the west central sections, while agriculture in the more populous areas of southern Yukon is limited by unfavourable topography and drier climate.

It is difficult to estimate the amount of arable land which is at present available for future agricultural development since much of the land has not been investigated in detail. Experts believe, however, that there is probably a half-million acres capable of cultivation, but about half of this should be economically classed as forest land. The largest single agricultural section is about 100,000 acres in the Takhini-Dezadeash Valley, while there may be as much as 60,000 acres along the Yukon River flats.

While general farming in the Yukon is greatly hindered by lack of markets to utilize the products grown, grazing has greater local possibilities. This is particularly true of the southern Yukon valleys where grass appears better and many open areas are found. In many places it is possible to winter horses on the grazing flats owing to the small amount of snowfall. The big game possibilities of the Kluane Lake area have meant that numerous horses have been

Left, top to bottom:—Part of the Alaska Highway through a possible agricultural area in the Takhini Valley

Good grazing country in the open wet meadows near Burwash Landing and Kluane Lake

Photo by C. H. D. Clarke

Alaska Highway crossing Aishihik River in the Dezadeash Valley.



pastured in this area to supply tourists with pack-horses. The new agricultural sub-station at Pine Creek intends to experiment with various varieties of grasses and legumes and most suitable types of beef and dairy cattle, in addition to general farm and garden practices. Scientific information should thus soon be available for any future grazing industry.

Gardening

Yukon gardening is an established and flourishing activity. It is quite possible everywhere where soils are good, and, in the chief settlements, gardens supply most of the vegetable requirements of the population. Dawson residents, in particular, have developed gardening to an extent that the nearby farmers have a serious problem in trying to dispose of their garden produce in the town. The situation is somewhat similar in the Mayo area, but Whitehorse has been limited by the sandy character of the townsite and has not been able to grow all of its own vegetables.

The ordinary varieties of vegetables are raised successfully throughout the Yukon and include peas, lettuce, rhubarb, carrots, beets, cauliflower, cabbage, brussels sprouts, parsnips, celery, beans, radish, Swiss chard, turnips, parsley, broccoli, pepper grass and, in large quantities, potatoes. In addition, numerous small greenhouses in Whitehorse, Dawson, and Mayo are used to produce tomatoes and cucumbers and, in early spring, to start such vegetables as cabbage and cauliflower. Small fruits grow wild throughout the Territory and are preserved in quantity by the local residents. Those most commonly used are red raspberries, black and red currants, gooseberries, cranberries, and fine quality blueberries. Wild strawberries are not plentiful, but grow in some areas.

Right, top to bottom:—

Kathleen Lake in the St. Elias Mountains from the Haines cut-off road Photo by C.H.D. Clarke

Across the Klehini Valley towards the snow-covered St. Elias Mountains Photo by C.H.D. Clarke

Wide, forested valley along Upper Snag River, near the Alaska boundary Photo by C.H.D. Clarke

Forested hillside at Mayo Lake. White spruce in the foreground Photo by F.H.R. Jackson



Right:—Aspen poplar forest, forty years old, typical of side hills along Stewart River



Left:—White spruce area along Stewart River cut-over for steamboat wood.

Photos by F. H. R. Jackson

The resident manager of the Pine Creek Experimental Sub-Station plans to visit Yukon gardeners during the summer and give assistance and advice as to choice of more suitable varieties of vegetables and best types of fertilizers. Since gardening will probably be of continuing and increasing importance to the residents, every encouragement will be given to those who wish to co-operate.

The long days of summer give a great impetus to growth of all kinds, and numerous flowers in particular add colour to the Yukon landscape.⁹ In mid-March the northern crocus appears, and by June wild roses are blooming throughout the valleys. In the same areas Siberian orchids thrive along with lupines, violets, anemones, harebells, poppies, buttercups, and many other flowering plants. Variety is the theme of Yukon gardens, which are the hobbies of most residents and a surprise to strangers. Almost every known variety of garden flower is raised to maturity, but sweet

peas, nasturiums and pansies are particular favourites.

Forest Utilization

The forest resources of the Yukon are available for greater exploitation if increases in population warrant it. South of latitude 65 degrees, in an area of about 110,000 square miles, it is estimated, from reconnaissance field work and aerial photographs, that about 15 per cent of the region may be considered as normally growing forest; 35 per cent is classed as unproductive forest or scrub, leaving the remaining 50 per cent as water, tundra or barren. The timber areas are in strips along the chief rivers and flat bottomlands and thus have fairly high local accessibility. It is probable that these Yukon forest resources could sustain an annual cut of 50 to 100 million board feet under present conditions—a large and important reserve for future development.

The amount of timber cut in the Yukon is but a small part of that which is

⁹—Black, Mrs. George. *My Seventy Years*. Toronto, 1938.

produced by the forests. The total annual timber cut under permit during the past ten years is shown in the following table:

Year	Board Feet	Cords
1934-35	67,000	9,739
1935-36	185,000	11,946
1936-37	483,760	16,401
1937-38	400,000	19,677
1938-39	671,576	17,888
1939-40	351,157	15,387
1940-41	306,000	19,531
1941-42	300,000	12,847
1942-43	1,305,000	13,658
1943-44	1,408,657	20,403

The preceding table mirrors the increased amount of timber used during the past few years to assist the various Yukon wartime activities, but it does not include a much larger amount which went directly into defence projects, free of permit requirements. In 1943-44 there were 14,500,-463 board feet, 618,123 linear feet, and 49,-356 cords of wood cut for the various construction works. Most of it was taken from along the Alaska Highway west of Whitehorse, and over 90 per cent of the fuelwood was dry wood from the Whitehorse area, thus cleaning up large areas of fire-killed and normally unmerchantable timber. Cutting will decrease in 1945 since construction work is virtually complete.

From the total of about 150,000 cords of fuelwood cut in the past ten years, almost 50 per cent has been used by the river steamers, and the remainder for domestic heating. It is estimated that the large Yukon river boats use about 100 cords of wood for a round trip of 930 miles and have probably used about 300,000 cords of fuelwood from the Yukon Valley in the past 40 to 45 years. Attempts to utilize the low-grade coal from Carmacks for boat fuel have not proved satisfactory. Other Yukon coal deposits have not been fully investigated as to the possibility of replacing wood as fuel. Since local costs of labour and transportation are high, and fuelwood is abundant and accessible, it is doubtful if coal can replace wood for this purpose. Fuel oil is also too

expensive to compete economically with wood at \$10 per cord for the river steamers.

Although there are comparatively large reserves of standing timber in the Yukon, and a fairly high potential yield, the prospects for greatly increased exploitation are not bright. Since the timber is located in long, narrow fringes along the water-courses, cost of logging operations will be higher than if the timber were found in more compact blocks. The forest products of Yukon can be marketed only in such places as cannot be more conveniently, and more cheaply, supplied from other sources. There are few such places. Even some of the lumber used at Whitehorse is imported from British Columbia through Skagway. Yukon itself would appear to be the chief market, but unless mining activity and other development increase only a small fraction of the annual growth will be used.

Conclusion

Agricultural and forest industries will hardly precede development; they can only follow. In southern Yukon, however, there will be greater possibilities of a fuller development if it is known that agricultural land is available nearby to complement any expansion. The forest resources are sufficient to supply timber for any increased activity. In central Yukon it would appear that there is enough land to produce food for an influx of mining population in the mineralized districts from Mayo westward to the Alaska boundary. At present these lands are unused, except for gardening. It is improbable that there is any extensive agricultural land in the region which might be developed into an agricultural community as in the Takhini-Dezadeash area farther south. On the other hand, the scattered character of good soils in the river valleys is an advantage in that some arable land may be near any future development in the lower Yukon Valley.

The future of agriculture and forestry in the Yukon is closely linked with the development of the other natural resources, and probably will always be dependent



Looking northeast over Whitehorse, Yukon. Lewes River in background

upon the present chief industry, mining. There has been little inducement for farmers to undertake operations due to marketing difficulties and uncertainties, lack of local labour, and competition from imported staple food products. A limited number of homesteads are available in the Yukon, but agricultural settlers are not being encouraged until more is known about the soils and climate of the area.

The physical factors of topography and

climate give the Yukon forest and agricultural resources comparable to those of more southerly Canadian regions. The utilization of these resources depends chiefly upon future population trends. In order to assist land use planning in the Yukon some factual data regarding agriculture and forests have been presented in this article, and the systematic investigations of resources which have now been started will serve as a basis for further studies.

Town of Dawson, the Territorial capital

White Pass and Yukon R.R. photos





The curious triangular bridge at Crowland, Lincolnshire, bearing a medieval effigy.

Romantic Bridges of Britain*

by ARTHUR GAUNT

A glance at a map of Britain is sufficient to reveal that bridges have played a major part in the historic development of the country throughout the centuries. Hundreds of places bear names denoting a river crossing—as Broughbridge, Bradford (broad ford), Ferrybridge, Brigham, and Pontefract (broken bridge). It follows that many of the structures spanning the rivers to-day are historic treasures of high order.

The general development of the bridges of the Mother Country goes back many centuries. The types still existing range from the primitive clapper (or cyclopean) variety to such modern examples as the recently-opened New Waterloo Bridge, London. There are packhorse bridges and medieval

specimens founded in monastic times.

Which is the oldest bridge in the country is undecided. Dartmoor's clapper bridges, consisting merely of stone slabs on supports, and minus a parapet of any kind, are commonly regarded as the most ancient. The most famous of these is Postbridge, Devonshire, often regarded as pre-Roman and therefore approximately 2,000 years old. Recent years, however, have seen its antiquity being contested, and the belief is growing that this particular example is of later origin than was hitherto assumed.

The Roman legions who occupied Britain for 400 years, and who established the first real roads in the country, favoured fords rather than bridges. Nevertheless, they did

*Except where otherwise credited, photos by J. Dixon-Scott, copyright British Council.

bridge some of the rivers, and a few reputedly Roman bridges still exist. One is to be seen at Preston (Dorset), and there are others at Colne (Lancashire), Tadcaster (Yorkshire), and Castle Combe (Wiltshire). An important Roman bridge crossed the Tyne at Chollerford, where the bases of the piers can still be observed, though the wooden superstructure has long since vanished.

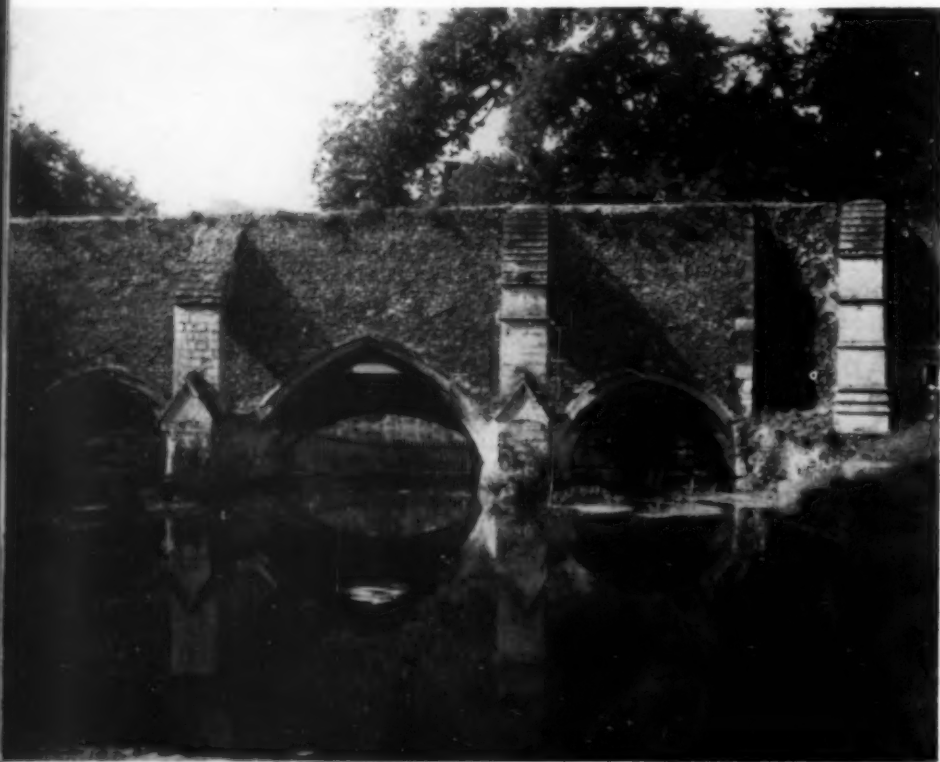
The end of the Roman Occupation brought a big decline in the development and maintenance of Britain's roads, and the Saxons built few bridges. Exceptions were at Winchester, Crowland (Lincolnshire), and Waltham Abbey. Winchester's old Soke Bridge is believed to have been built by St. Swithun in the ninth century, and that at Crowland dates from the same period, though both these examples have undergone considerable reconstruction and restoration. The Crowland specimen is not only ancient but a curiosity in its design, for it spanned three streams and is triangular in shape. Three approaches are provided, and though it has been left high and dry by the diversion of the streams, it was necessarily built originally to provide access to the nearby Abbey of St. Guthlac.

It was the monks of the Middle Ages who

first began intensively to develop Britain's bridges, and many of the old structures existing to-day were established for the convenience of pilgrims and other travellers in those distant days. Wealthy benefactors provided the money specifically for the erection of bridges, and funds were also sometimes raised by the sale of indulgences. The Bishop of Durham, for instance, in 1425 gave forty days' indulgence to all who confessed and contributed to a new bridge over the River Wear.

The Cistercian monks in particular encouraged the building of bridges, for the scattered properties of the Order entailed a good deal of travelling. Such monastic influence is usually indicated to-day when a bridge is seen to have pointed arches, examples later than the fifteenth century usually being built with rounded arches. An interesting specimen in this connection is Kildwick Bridge, Airedale, Yorkshire. Two of its four arches are pointed, but the others are rounded—a fact which provides evidence of the widening of the structure since monastic times. The undersides of the arches are also ribbed, in accordance with a custom of the fourteenth and fifteenth centuries.

The Church authorities took a keen in-



*Abbots Bridge at
Bury St. Edmunds,
Suffolk—a monas-
tic bridge*



The old Postbridge, Dartmoor, Devon. Modern research tends towards the belief that it is not of pre-Roman origin, as was formerly supposed.

terest in the erection and upkeep of Britain's bridges in the past. During the Scottish religious revival of the mid-sixteenth century, there was activity all over the country for the construction and maintenance of bridges which would serve churches. Some Scottish examples are still referred to as "col-

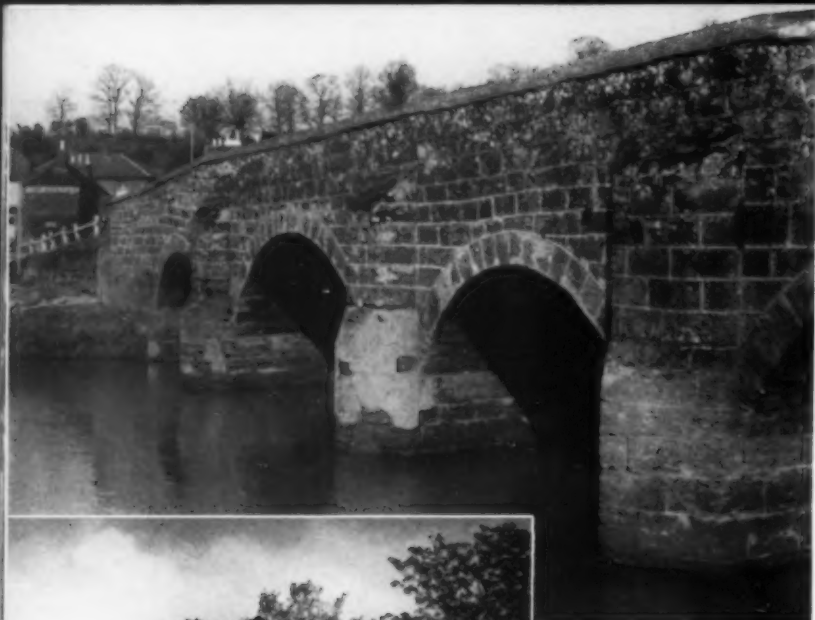
lection" bridges, having been built and maintained for many years in the past by collections made in the churches. One "collection" bridge is Stow Bridge, Midlothian, an odd specimen consisting of one big span and a small one.

It was both to obtain funds and to cater

An eighteenth-century packhorse bridge, near Bingley, Yorkshire. Many such bridges have survived in England.

Photo by author





Left:—The bridge and River Arun at Pulborough, Sussex



Centre left:—Mock Bridge, Shermanbury, Sussex



Above:—Huntingdon Bridge and River Ouse



Left:—Old picturesque bridge, Waverly Abbey, Surrey

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High Bridge, Lincoln, one of the two bridges bearing houses now remaining in England from medieval times.

to pilgrims that chapels or chantries were set up near many of the old bridges. Here prayers were said for travellers, by a hermit or priest in charge of the chantry, and alms were expected from pilgrims in gratitude for a safe journey thus far.

Only a handful of these bridge chapels now remains in Britain, though they were numerous in the Middle Ages. Those which still exist are therefore very valuable relics, and the most notable of all, at Wakefield, Yorkshire, was restored some six or seven years ago. This Wakefield bridge chapel is unique because it is the only existing one still in use as a chapel. The west front bears intricate carvings, and these, like the interior, have undergone judicious restoration. Another bridge chantry, which was

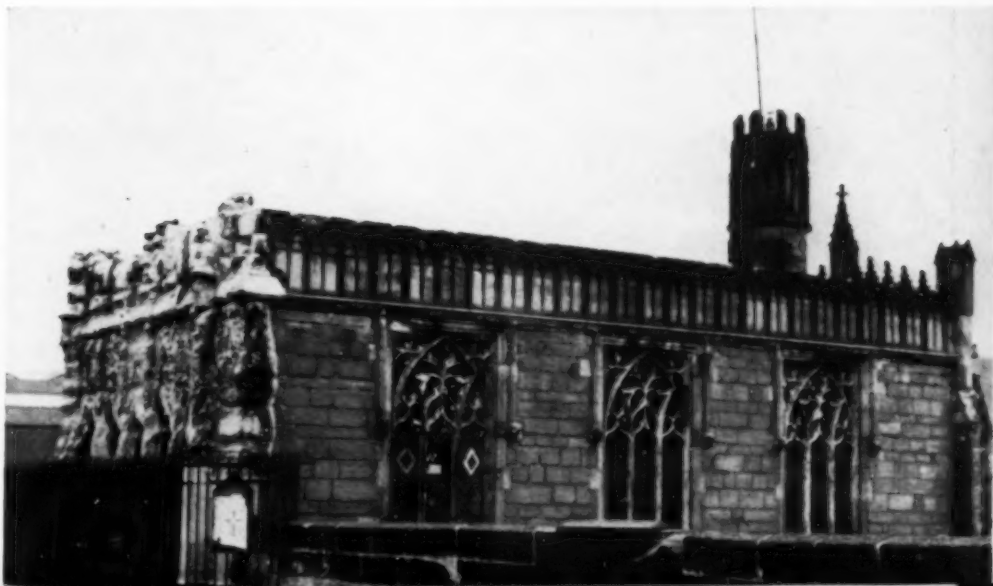
turned into a lock-up after its original purpose expired, is at Bradford-on-Avon; a third, subsequently turned into a store, is at Rotherham; and a fourth stands at St. Ives, in Huntingdonshire.

Houses, too, were not infrequently built on bridges in medieval days; old London Bridge was an instance, as also was the bridge over the Ouse at York. Only two examples remain in Britain to-day—the High Bridge, Lincoln, and Elvet Bridge, Durham. Pulteney Bridge, Bath, has houses built on it, but this is a more modern structure, dating from the eighteenth century.

Historic events around Britain's bridges in past times have helped to increase still further the romance of these structures. The Battle of Stamford Bridge, when the Saxons defeated the forces of Harold Hardrada in 1066, established a custom which was observed at this place until quite recent times. Stamford Bridge children used to eat boat-shaped pies on the anniversary of the battle, to commemorate the feat of a Saxon who floated under the bridge in a coracle and slew the leader of the Norwegians who held the bridge. It is worth pointing out, too, that had not Harold the Saxon been fighting at Stamford Bridge, he might have been better able to deploy his forces against the Norman invaders at Hastings, later in the same year, and the whole course of English history might then have been changed.

Wakefield Bridge Chantry, a relic of the days when chapels were built on or near many English bridges.

Photos by author



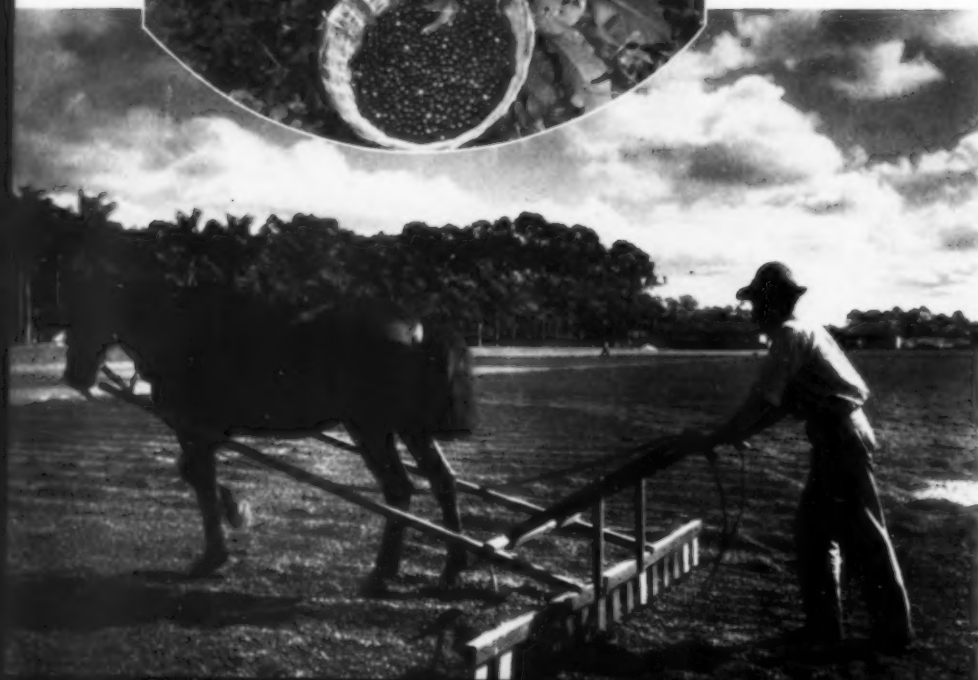


Harvesting coffee, São Paulo, Brazil.
Rembrandt photo



Centre:—Native Indian woman picking coffee berries, Guatemala.

H. C. Lanks photo



Drying coffee, São Paulo, Brazil.
Rembrandt photo

Canada's Trade Ties With Latin America

by ARTHUR L. NEAL

CANADA is becoming Latin America conscious. Increasingly, Latin America is becoming aware of Canada. This mutual recognition has been long in coming, due largely to the fact that each part had its early political and cultural associations with Europe. The early colonial policy of Spain, Portugal and Britain did not permit economic contacts between their various outposts in America. Moreover, while geography has placed both Canada and Latin America in the same hemisphere, they are nearer to Europe in actual distance than to one another.

While Latin America produces a number of things not native to Canada, and vice versa, the two areas are, to a degree, competitive rather than complementary. Trade between them has sometimes tended to be conducted through the medium of third countries. Both areas have been largely dependent on the export of bulk materials, which resulted in trade being directed towards the more mature economies. These deterrents to an early development of closer economic relations between Latin America and Canada do not exist with the same force as formerly. The Latin American countries have long since thrown off their European political connections, and Canada, while retaining its proud place in the British Commonwealth, has grown to full nationhood. Improved transport has narrowed geographical separation. For travellers, the trip from, say, Montreal to Buenos Aires has been cut from twenty-three days by steamer to five days by giant airliner. Short wave radio communication has brought the two within sound of each other's voices, although there is still room for development here. Exchanges of students and exchanges of

art exhibitions reflect a growing mutual interest in divergent cultures.

A gratifying indication of Latin American regard for Canada was the resolution adopted at the Inter-American Conference on Problems of War and Peace held in Mexico City in March, 1945. Recognizing Canada's material contribution to the defence of the American Continent through a war effort which encompasses all the resources of the country, the Conference paid a tribute of admiration and gratitude to Canada.

In extending thanks on behalf of the



C. G. J. map





C. G. J. Map



Canadian cod being dried and cured for overseas markets. A typical scene in the Gaspé Peninsula where the fisher-folk of some forty villages help to supply a hungry world with food and cod-liver oil.

N.F.B. photo

people of Canada for this generous resolution, the Prime Minister said: "We are proud to share in the defence of freedom on this Continent as in Europe and Asia. We are convinced that the basic solidarity of the peace-loving people of this Hemisphere will contribute materially in the post-war period to both regional and world security. We greatly welcome the increased collaboration in all matters of mutual interest and concern with our neighbours of the Americas."

Formal and official recognition of the growing association of Canada and the American nations below the Rio Grande is given by the exchange of diplomatic missions. Canada now has Embassies in Brazil, Chile, Mexico, and Peru, and Legations in Argentina and Cuba.

Pre-war Trade between Canada and Latin America

Trade between Canada and Latin America has always constituted but a minor proportion in the total commerce of both areas. Even in the boom year 1929, total exports from Canada to the twenty Latin American republics amounted to little over \$42 millions, and, during the depression,

fell far below that figure, dropping in 1932 to a low point barely over \$9 millions. In 1938, the last full year before the outbreak of hostilities, exports to all Latin America amounted to \$17 millions, or two per cent of the total exports from Canada. None of the individual Latin American nations appeared in the first dozen export markets for Canadian goods. Argentina, the largest market among them, bought Canadian goods valued at \$4,675,000 in 1938, and stood in fourteenth place among all of the Dominion's external markets. Brazil, to which exports amounted to \$3,522,000, stood in eighteenth place, and Mexico, exports to which amounted to \$2,340,000, stood in twenty-second place. Total exports to the whole of Latin America in 1938, valued at \$17,410,000, compared with exports to Australia at over \$33 millions, to Japan valued at nearly \$21 millions, New Zealand over \$16 millions, and to British South Africa of \$15½ millions.

Imports into Canada from Latin America in 1938 amounted to \$16,015,000, or 2.4 per cent of total imports. In that year Colombia, the largest Latin American supplier of Canada's imports, stood in eighth place among all sources of imports.

CANADA'S TRADE TIES WITH LATIN AMERICA

Exports from Canada to Latin America

Exports to Latin America have increased substantially in the war years but nevertheless remain considerably below the peak year figure of \$42,709,000 registered in 1929. The value of exports by countries are given in the table below:

EXPORTS FROM CANADA TO LATIN AMERICA

Calendar Years 1938 and 1944

Countries in order of importance 1938

	1938	1944
	Thousands of Dollars	
Argentina	4,675	3,645
Brazil	3,522	7,324
Mexico	2,340	6,273
Colombia	1,270	2,215
Venezuela	1,256	1,810
Cuba	1,186	3,725
Peru	892	1,339
Chile	604	1,648
Panama	304	672
Dominican Republic	296	398
Uruguay	216	1,331
Honduras	170	114
Haiti	120	505
Guatemala	120	349
Bolivia	117	206
Costa Rica	99	314
Nicaragua	75	251
Ecuador	52	301
El Salvador	47	275
Paraguay	11	30
Total	17,372	32,725

With their former main sources of supply cut off by the war, Latin American countries naturally turned to North America. Canada was able to meet this increased demand only in a limited way as her main attention had to be directed, and still is, towards winning the war. The tight supply position has prevented Canadian manufacturers from filling orders which have been received for most lines. In other cases the scarcity of shipping space prevented shipments from going forward when the supply position would have permitted.

The leading commodity among the exports to Latin America is *paper*, mainly newsprint, which finds a market to some extent in all of the American nations below the Rio Grande. Increased shipments of newsprint account for about half of the wartime growth in export trade to this area. *Rubber manufactures* were a leading export before the war to all of the countries, the main item being tires. This trade has been practically

Diggers at work on a New Brunswick potato farm. Inset:—S.S. Oscar Gorthon unloading Canadian certified seed potatoes at Buenos Aires (November, 1941).





Harvest scenes in one of the vast Canadian wheat fields.

Inset: — Most Latin American countries import wheat and also flour milled in Canada.

N.F.B. photos

Below:— A reaper-thresher manufactured in Canada at work in an Argentine wheat field. More than 40,000 of these machines are now in use here.

wiped out, however, in recent years, amounting in 1944 to only \$73,000, as compared with \$2,581,000 in 1938. *Farm implements* are also sold in substantial quantities to Latin American countries. The principal

market is normally Argentina, but sizeable quantities are also sold in Brazil, Chile, Colombia, Mexico, and Peru, as well as smaller amounts to some of the other nations. Exports of this item have also de-





Newsprint at Wolfe's Cove, Quebec, ready for shipment to Latin America N.F.B. photo

Inset:—Unloading Canadian newsprint at Callao, Peru.

clined since the outbreak of hostilities. *Non-ferrous metals* and manufactures found a market valued at over \$2,000,000 in both 1938 and 1944 in all of the Latin American countries. *Soda compounds* are a leading export to Mexico and are sold also in Nicaragua, Honduras, Brazil, Chile, Colombia, Ecuador, Peru, and Venezuela. *Sewing machines* constituted a leading export, the principal Latin American markets in recent pre-war years being Brazil and Mexico, but the war has resulted in contraction of exports from \$1,550,000 in 1938 to \$372,000 in 1944. Canadian *seed and table potatoes* are highly esteemed in Latin American

Asbestos fibre comes out of this machine white and fluffy, ready to be fed into wick formers, carding machines, and spinning frames in the textile department of an asbestos factory at Asbestos, Quebec.

N.F.B. photo





The rich, rolling farm land of central Costa Rica raises a great variety of both tropical and temperate climate crops. Harvesting pineapples at El Cacao, near Alajuela.

H. C. Lanks photo

countries and before the war were exported in substantial quantities to Argentina, Cuba and Venezuela. Exports to these countries and, in smaller amounts, to some of the other republics of Latin America, amounted to \$529,000 in 1938. In 1944 exports were valued at \$1,062,000. Canadian wheat and flour find markets in all the Latin American countries with the exception of Argentina, Paraguay and Uruguay. Exports have grown from \$256,000 worth before the war to \$1,624,000 worth last year. *Dried fish*, principally cod, has long been an important item in the diet of many of the Caribbean islands, and exports from Canada of this commodity to this area is an historic trade. Exports in 1944 were valued at \$815,000, of which Cuba accounted for more than half, the remainder of the exports being consigned to the Dominican Republic, Haiti, Panama, and Mexico. *Whisky* is exported from Canada to all the Latin American countries. *Pipes and tubes of iron* valued at \$193,000 were exported to numerous countries in Latin America in 1938. The war has increased this trade to \$650,000 in 1944. *Asbestos* is another item now exported in considerable quantity to Latin America, exports in 1938 being valued at \$56,000 and at \$893,000 in 1944. Other important exports to Latin America include apples fresh, sold principally in Argentina and Brazil, processed milk, of which there were no exports in 1944 however, Portland cement, and canned salmon. The items specifically listed above comprised 82 per cent of total exports from Canada to Latin America in 1938 and 62 per cent in 1944. The remaining items included a wide range of commodities shipped to the various countries in relatively small amounts. Certain articles, noticeably motor cars, which were formerly exported to Latin America in fairly large volume lost

Cocoa pods on the tree, Bahia, Brazil

Rembrandt photo





Cutting bananas on the United Fruit Company farms, Honduras.

H. C. Lanks photos

their markets during the depression. Canadian exports to Latin America in 1929 included a total of \$8,822,000 for automobiles and parts. By 1932 this had dwindled to only \$34,000 and has since remained at a low level.

Imports from Latin America

While industrialization has proceeded a considerable distance in some of the Latin American countries, exports are still mainly confined to agricultural and pastoral products and to minerals, including oil. Canada's imports from the whole of Latin America in 1938 amounted to \$16 millions, of which petroleum accounted for \$9,650,000 and



Loading bananas at Tela, Honduras.



coffee \$1,310,000. Other important commodities were flaxseed, canned meats, hides and skins, tomatoes, fresh fruits and sugar. Imports into Canada from all the Latin American countries in 1938 and 1944 are given below:

IMPORTS TO CANADA FROM LATIN AMERICA
Calendar Years 1938 and 1944
Countries in order of importance 1938

	1938	1944
	Thousands of Dollars	
Colombia	6,903	13,782
Peru	3,005	95
Argentina	2,149	9,564
Venezuela	1,469	13,826
Brazil	769	7,224
Mexico	576	13,119
Cuba	440	4,229
Chile	179	723
Uruguay	137	248
Guatemala	85	2,693
Costa Rica	76	1,361
Haiti	62	2,097
Paraguay	58	208
Honduras	38	1,349
Ecuador	28	566
Salvador	17	2,561
Panama	16	6
Bolivia	8	14
Total	16,015	78,628

Increased wartime imports into Canada from Latin America were in part owing to greater needs for commodities which were traditionally obtained in Latin America, and imports of petroleum, sugar, coffee, hides, and skins have accounted for 50 per cent of the increase between 1938 and 1944.

From South American republics Canada's main imports have been petroleum (Colombia, Peru and Venezuela) and coffee (chiefly Brazil and Colombia). Argentina has supplied principally maize, flaxseed, cattle hides, canned meats, and quebracho extract for tanning. Wartime imports from Argentina have increased substantially as indicated in the table above. In 1944, various seed oils were important, while corn, which formerly was a large import, was not purchased in that year.

Tires were a leading pre-war Canadian export to all countries.

Top to bottom:—

Heavy service tire pocket being started onto a building drum.

A tire being hoisted out of a huge press.

These big fellows are ready to do a vital job.

Two extremes—the aeroplane tail wheel tire looks diminutive next to the husky combat tire.

Photos courtesy Dominion Rubber Company

The substantial growth in imports from *Brazil* between 1938 and 1944 is largely accounted for by an almost sixfold increase in the direct shipments of coffee, but other products, such as cocoa beans and crude rubber, siliceous quartz, and natural menthol, as well as a number of other products formerly obtained from other sources, also contributed.

The increase in imports from *Colombia* was almost entirely due to greater shipments of the two main imports, petroleum and coffee. Imports from *Chile* before the war consisted almost exclusively of sodium nitrate which, along with copper, comprises the only important export from that country. Imports of sodium nitrate increased in 1942, but there were also imports of one or two other commodities, of which the principal one was sisal, istle and tampico fibre. This reflects the cutting off of supplies from the Philippines and other oriental sources.

The decline in imports from *Peru* was due to the virtual cessation of imports of crude petroleum. The wartime import from *Venezuela* remains crude petroleum as formerly.

Mexico is important as a source of supply to Canada. Commodities contributing to the wartime increase in imports include greater imports of tomatoes and fresh fruits, raw cotton, sisal, and similar fibres, as well as a number of other items of less importance, including raw rubber. The countries of Central America contributed mainly fresh fruits and coffee.

From the *Caribbean area* the principal imports into Canada are bananas and other fresh fruits, sugar, cigar leaf and cigars, the last coming from *Cuba* exclusively.

Trade Agreements and Tariff Arrangements

An important milestone in Canada's commercial relations with the countries of Latin America was the mission of senior Canadian officials headed by the Honourable James A. MacKinnon, Minister of Trade and Commerce, to several of the nations

of South America in 1941. This mission led by a Cabinet Minister, and the cordial reception it received everywhere, are symptomatic of the growing cordiality between Canada and Latin America. Tangible evidence of the mission's work is found in trade agreements negotiated with Argentina, Brazil and Chile. At the same time there was effected a *modus vivendi* with Ecuador. Satisfactory arrangements regarding exchange difficulties were concluded with Uruguay, and an agreement in principle was reached with Peru, looking toward a subsequent formal trade agreement. The war and its concomitant limitations on trade have naturally obscured the working out of these trade agreements, but they are on the Statute Books and will form part of the framework within which mutually advantageous post-war development can be anticipated.

The Trade Agreement with Argentina supersedes an Anglo-Argentinian Treaty of 1825 which previously governed tariff relations between Argentina and Canada. The new Agreement and the Agreements concluded with Brazil and Chile provide for the exchange of most-favoured-nation treatment. This means that Canada and the other contracting countries agree that each will accord to the goods of the other the lowest duties applied to similar goods imported from any country. Exceptions are made respecting the advantages accorded by Canada to the rest of the British Empire, and the Latin American countries reserve from the most-favoured-nation principle certain concessions granted to contiguous republics.

The commercial *modus vivendi* between Canada and Ecuador was effected by an exchange of notes in August, 1941. Through this *modus vivendi* an Ecuador surcharge of 50 per cent which had been levied against most Canadian goods since 1936 was removed. Canada also obtained the benefit of certain preferential rates of duty in force on numerous items of the Tariff of Ecuador. These rates are, in most cases, 30 per cent below the normal tariff.

CANADA'S TRADE TIES WITH LATIN AMERICA

In some cases, Canada's trade with Latin American nations is governed by the terms of treaties concluded by the United Kingdom. Since Canada has now complete autonomy in foreign relations the provisions of these treaties were affirmed by Order-in-Council. Canada's trade and tariff relationships with Latin American countries are summarized in the statement below.

CANADA'S TRADE RELATIONS WITH LATIN AMERICA

A. Canada has most-favoured-nation trade arrangements with:

1. Argentina	Canadian Trade Agreement
2. Brazil	" " "
3. Chile	" " "
4. Dominican Republic	" " "
5. Guatemala	" " "
6. Haiti	" " "
7. Uruguay	" " "
8. Ecuador	Canadian <i>Modus Vivendi</i>
9. El Salvador	" " "
10. Venezuela	" " "
11. Bolivia	Recent British Trade Treaty

12. Costa Rica Recent British Trade Treaty
13. Panama
14. Colombia Old British Trade Treaty

B. Canada has accorded the benefit of its Intermediate Tariff to:

1. Paraguay.

C. The following countries have no commercial trade arrangement of any kind with Canada:

1. Cuba
2. Honduras
3. Mexico
4. Nicaragua
5. Peru

Post-war Outlook

The outlook for trade between Canada and Latin America is subject to several uncertainties and conjectural elements. It is safe to say, however, that the prospects in general are good for a developing trade and sound expansion on a higher level than existed before the war. Opportunities for increased trade exist, but the extent to which these can be realized depends in a large measure upon the success with which the world meets the task of reorganizing



C.G.J. map



*Left:—Cutting su
cane on a Cu
sugar plantation.
Courtesy Cuban T
Commission*



Above:—Cuban tobacco field. A section is enclosed with cheesecloth to prevent perforation of the wrapper leaves by insect pests.



Left:—Load of sisal fibre (called "fique") used for making rope, being brought into Bogota, Colombia.

itself for a peaceful and prosperous existence. Throughout the war years a large proportion of Latin American import requirements could not be satisfied, and, in the early post-war period at least, there will be in all of the countries south of the Rio Grande exceptional demands for all classes of goods. At least a part of these demands Canada is, or will be, in a favourable position to satisfy.

Many of Canada's traditional markets, particularly in Europe, will be difficult to re-establish because of lack of purchasing power or exchange. This is not true of most of Latin America. These countries will enter the post-war era well supplied with funds. The Latin American countries have increased their exports during the war while, as stated above, their opportunities for buying imported goods have been limited by necessary wartime restrictions and transport difficulties. In consequence, they have built up large holdings of gold and foreign exchange. Approximate estimates indicate that Latin American holdings of gold and exchange may have reached a total of from \$3.5 to \$4 billions by the end of 1944. A report of the Foreign Policy Association states that the bulk of these balances are held by South American countries rather than those of Central America, although Mexico and Cuba (both important Canadian markets) also possess substantial amounts. Argentina (ranking first in this regard with about one-third of the total) and Brazil (with between \$550 to \$600 millions) together accounted for more than half of Latin America's balances abroad. These reserves, it is generally believed, will go far towards cushioning the post-war readjustment and will reinforce the growing interest which Canadian exporters are displaying toward Latin America. On the other hand, it should be realized that some of these reserves may be used for purposes other than for import trade, and, in any case, they are not inexhaustible.

There are natural fears that Latin America's recent prosperity is a wartime boom and may suffer a serious relapse

after the cessation of hostilities. This is not inevitable. While it is true that Latin America's principal export commodities are limited in variety, a prosperous world in peace may still constitute an adequate market. Industrialization within Latin America does not at the present bid fair to creating new export commodities but will, to some extent, lessen the dependence upon imports in certain lines. However, insofar as increased industrialization results in greater domestic prosperity and larger purchasing power, the Latin American area will continue to constitute a market well worthy of cultivation.

The rapid growth of air travel and air mail facilities will have an important effect upon the expansion of Canadian-Latin American trade in the years ahead. There will be no comparison between the ease and speed of communication in the future with the means of commercial contact that prevailed in the past. The volume of both commercial and non-commercial travel between Canada and South America is almost certain to be away beyond anything that we have known heretofore.

The MacKinnon Mission of 1941 has done much toward laying a sound basis of commercial policy, and the war has established a further basis of goodwill between Canada and Latin America that should redound to the advantage of post-war trade between the two areas. The mutuality of the trade relations should not be overlooked. A moderate proportion of Latin America's export staples are either goods of a kind which Canada has no need to import or which, in normal times, have been obtained more advantageously elsewhere. Nevertheless, as the war has demonstrated, Canada has need of Latin American products, and provided always that world trade conditions are favourable and Canada is prosperous, there can develop in this Dominion a future demand not incommensurate with what the Dominion hopes to sell.

This article has been exclusively concerned with trade in commodities but

Chilean nitrate shipments in railroad yards at Tocopilla



should not be concluded without mention of the fact that, notwithstanding the enormous financial interests of the United States and of Britain in Latin America, Canada has a surprisingly large volume of economic interest in that area over and above commodity trade. Canadian companies are interested in mining, oil drilling, public utilities, and other activities, while

Canadian banks have branches in the area, and some Canadian insurance companies are active in Latin American countries.

The term "Latin America" used throughout the foregoing is a convenient but a somewhat inapt term. It is a useful heading under which to aggregate the trade of different countries having geographical proximity within the western hemisphere,



Pipelines carrying oil from the interior of Venezuela to the Caribbean coast where the oil is loaded on ocean-going tankers. Puerto La Cruz terminal for the Tigre oil fields

H. C. Lanks photo



Tanks where nitrate crystallizes, Chile.

but it obscures the fullness of their individuality. Each has besides its own particular economic structure a proud national heritage, a rich, ancient and distinctive history, as well as a racial and cultural character of its own. The growing interest in commerce between Canada and these countries is only symptomatic of a growing interest in a wider and fuller association. Exchanges

between the two are rightly not confined to trade in material goods. They extend also to such matters as touch close to the heart and mind. Insofar as Canada's trade with these nations develops, it will contribute to a more prosperous world. Growing exchanges of the non-material kind and the interaction of divergent cultures can well contribute also to a nobler world.

Oil refinery at Talara, Peru

Courtesy International Petroleum Co., Ltd.





Arctic Avens (Dryas integrifolia) mign

In late June thousands of Callas (Calla palustris) fill the ponds and ditches.

Plant Life of the Churchill District

by EVA BECKETT

AT 58 DEGREES north latitude, the seaport town of Churchill on the west coast of Hudson Bay is deep into the Sub-Arctic. Naturally, the plant-life here differs considerably from that of the more southerly latitudes of Canada, and for that reason alone would pique one's interest.

Indeed, it is often a matter of considerable astonishment to those making their first trip into the North to find that plants in such variety and profusion actually do exist here. Perhaps our old geography books were somewhat to blame for that. So often they despatched the subject of northern vegetation lightly and briefly, limiting it to a few "mosses, lichens, and stunted shrubs".

But there is much more to it than that.

Even this bleak west coast of Hudson Bay at Churchill yields many excellent types of edible mushrooms; amazing quantities of gooseberries, blueberries, and bog cranberries; and a great profusion of wild flowers that lend colour and charm to the rocky coastline and windswept tundra.

It is true that the summers here are short, but one must bear in mind that during June and July there are very long days of brilliant sunshine. The nights then have only two to three hours of real darkness. Consequently, there is an extremely rapid plant growth and development, and the colours of many of the wild flowers are much more vivid than are those of similar species in more southerly regions.



Calla palustris) might be chosen as a floral emblem of the North.

Water Parsnip (*Sium cicutaefolium*)



Towards the latter part of June, when all the Northland has thrown off the bonds of winter, the Hudson Bay route offers constant interest and delight to any plant lover. On leaving The Pas, the first part of this route is through rich forest country. Farther on, one comes to the "Land of Little Sticks", as the Indians call it—the last timber before the barren lands. Then, one travels miles across the "barrens", which, by the way, are really not barren, and again into a narrow strip of forests—scrubby trees, this time, with their branches all blown to one side by the prevailing north winds. Finally, there is the open country of rocks and muskeg that forms the coast of Hudson Bay.

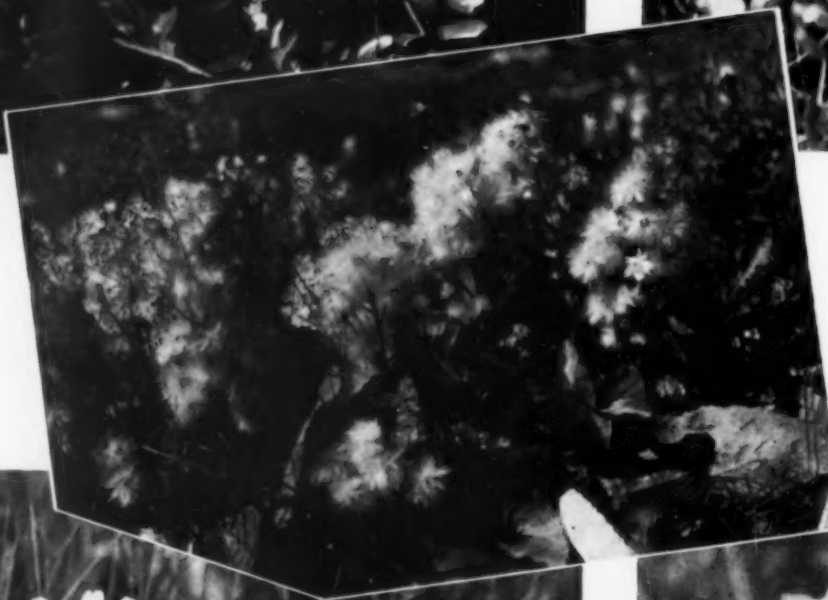
Though summer is, by the end of June, well advanced in the southern part of Canada, a vernal freshness still prevails all along this northern route. Tamaracks are decked in their daintiest green. Great clusters of the Yellow Lady's Slipper (*Cypripedium parviflorum*) bloom on the edge of the forest. Thousands of Marsh Callas (*Calla palustris*) raise their white chalice

from ponds and ditches filled by the recently-melted snow, while, for miles across the tundra, Wild Rosemary (*Andromeda polifolia*) has lightly spread a delicate pink shroud.

Within a fortnight, this lovely picture will almost completely have given way to another equally delightful. By then, Orange Lilies (*Lilium philadelphicum*), and Pitcher Plants (*Sarracenia purpurea*), like Darwin tulips on their tall stems, dance at the edge of the forest. Primroses and cresses struggle for space among the grasses and sedges in the rapidly drying ditches. And out over the tundra, as far as the eye can see, is the vivid magenta of the Trailing Azalea (*Loiseleuria procumbens*). Thus, in rapid succession all through the short summer, each flowering plant hastens on to maturity.

If a floral emblem were to be chosen for this district round about Churchill, it would, no doubt, be the Arctic Aven (*Dryas integrifolia*), which blooms profusely throughout a longer period of the summer than almost any other plant found here. It is a low creeping plant with narrow leathery

Below:—Pyrolas (Pyrola americana) are among the earliest flowering plants.



Above:—Growing abundant everywhere is Arctic Milk Vetch (Atelophragma alpinum).

Centre:—Coltsfoot (Petasites sagittatus), once known as "Cough wortz", was collected and dried as an herb.

Bottom left:—Arctic Ox-eye (Leucanthemum arcticum) star in northern meadows and rocky hillsides.



Above:—The chaste white blossoms of Grass of Parnassus (Parnassia palustris)

green leaves that are white and downy underneath. Its lovely anemone-like blossom has golden stamens surrounded by a corolla of creamy-white petals that open wide as if to radiate some of the brilliance of the northern sunshine. When the petals have fallen, the seed-pod itself is very pretty with its long silky tassel, each fine white thread of which is attached to a tiny brown seed. Equally lovely, though not as abundant here, are the White Mountain Avens (*Dryas octopetala*) that are readily distinguished by their notched leaves.

There is always something breath-taking about finding the first primrose of the season. So dainty are these lovely little flowers, one scarcely expects to find them as far north—yet, almost as soon as the ice has gone from the ponds, the Arctic Primrose (*Primula stricta*) and the Mealy Primrose (*Primula farinosa*) are in bloom on the banks. With them we find also the Smooth Androsace (*Androsace septentrionalis*), another dainty, though less noticeable, member of the *Primulaceae* family.

When the primroses are fading, Meadow Bitter Cresses (*Cardamine pratensis*) are ready to take their place. Their pretty pink and white flowers and lace-like leaves make them among the loveliest of the sixteen or more members of the *Brassicaceae* family found in this district. Later, tall Water Parsnips (*Sium cicutaefolium*) will stand guard on the banks of these same ponds and open their broad disks of small white flowers.

Among the earliest flowering plants of this district are the pyrolas. Great numbers of the Round-leaved Wintergreen (*Pyrola americana*) cluster at the foot of almost every large rock, absorbing there the warmth and moisture needed for producing the most exotic blossoms of this species to be found anywhere in Canada. Their tall flowering scapes, hung with pink or white bells, rise twelve to sixteen inches above the shiny green leaves. Rarer, and very different in appearance, is the lovely One-flowered Wintergreen (*Moneses uniflora*) which seeks the mossy bogs. Its single flower with wax-like petals is lifted above the moss on a slender

stem about six inches high. The One-sided Pyrola (*Orthilia secunda*) and the Green-flowered (*Pyrola chlorantha*) are to be seen here too.

For rapid growth and development, no other plant in this locality can equal the Coltsfoot (*Petasites sagittatus*). Within a few days, its thick hollow stalk, bearing a solitary flowerhead of white or very pale yellow ray florets, sometimes attains a height of three feet. The flower has a sweet, pleasant fragrance and is fully matured before the broad, arrow-shaped leaves appear. In olden days, when Coltsfoot was more commonly known as "Coughwort", it was supposed to have certain medicinal qualities, and was collected and dried as an herb. People suffering from asthma sought relief in smoking its dried leaves, while, for a cough, what was better than a cup of hot coltsfoot brew?

Another herb that thrives here and blooms all summer long is Yarrow (*Achillea borealis*). "Soldier's woundwort" it was called in ancient times, and legends tell us that Achilles, at the siege of Troy, used this plant to heal his soldiers' wounds.

No plant, perhaps, has a more interesting legendary association than the Anemone, or Wind Flower. In ancient times this little flower was dedicated to Anemos, the Wind God of Greek mythology, who, it was supposed, used it to announce his presence in the springtime. We find several species in this district: the Canadian Anemone (*Anemone canadensis*), the Red Wind-flower (*Anemone hudsoniana*), the Northern Anemone (*Anemone parviflora*), and Richardson's Anemone (*Anemone Richardsoni*).

There would surely be something lacking if summer, even in the Sub-Arctic, did not bring its Daisies. So, by mid-July, one rejoices to find the Arctic Ox-eye (*Leucanthemum arcticum*) starring the northern meadows and rocky hillsides. In company with it are one or two other varieties.

For house bouquets, one may gather great armfuls of Hedysarum (*Hedysarum americanus*) that grows in such abundance over the higher stony ground. The bright colour



Vernal Sandwort (Sabulina propinqua) is a foam of white flowers.

of its blossoms, between purple and magenta, and its sweet perfume, that quickly fills a whole room, make it a great favourite. At least seven other members of this large *Fabaceae* family grow here too. One of the most common is the Arctic Milk Vetch (*Atelophragma alpinum*).

Rivalling the gay colour of the Hedy-sarum, the Indian Paint Brush (*Castilleja*) emblazons the hillsides with bright scarlet and rose. Few localities show so many varieties of this plant or such variations of colour, which may range all the way from pearly grey to deepest crimson. These gay flowers make very disappointing bouquets, however, so soon do they lose their beauty when plucked.

By the time the Indian Paint Brush and Hedy-sarum are fading on the hillside, they have already been supplanted by the Great Willow Herb, or Fireweed, (*Chamaenerion spicatum*). Only in the North does one see this flower at its best. The vividness of its colouring and the size of its flowers make all southern varieties pale and anaemic in comparison. Very striking, too, with its bright purple flowers, is the Broad-leaved Fireweed (*Chamaenerion latifolium*), which riots over the gravelly soil. A third variety, the Linear-leaved Willow Herb (*Epilobium lineare*), is much less conspicuous.

Like vestal virgins in the temples of ancient Greece stand the chaste white blossoms of Grass of Parnassus (*Parnassia palustris* and *Parnassia americana*). These plants choose damp stony places and bloom throughout most of the northern summer.

Also a lover of damp places is the Common Butterwort (*Pinguicula vulgaris*). Its deep blue, violet-like flower rises on a slender stem six or seven inches above a cluster of basal leaves that flatten themselves against the moist earth. Side by side with it is the Hairy Butterwort (*Pinguicula villosa*).

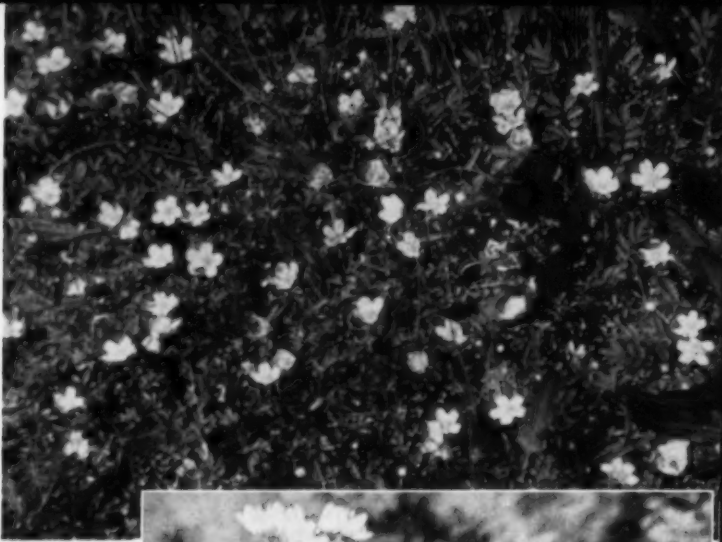
When making a collection of the plants of this locality, it is always intriguing to find that the names of so many of them have as a suffix the old Saxon word, "wort", a plant. There is Sea Lungwort (*Pneumaria maritima*), with its tiny flowers of exquisite blue;



Marsh Ragwort (Senecio palustris) spreads a golden mantle over acres of damp ground around the sloughs.

Right:—Growing in low damp places, Goose Tansy (*Argentina Anserina*) opens blossoms like golden roses.

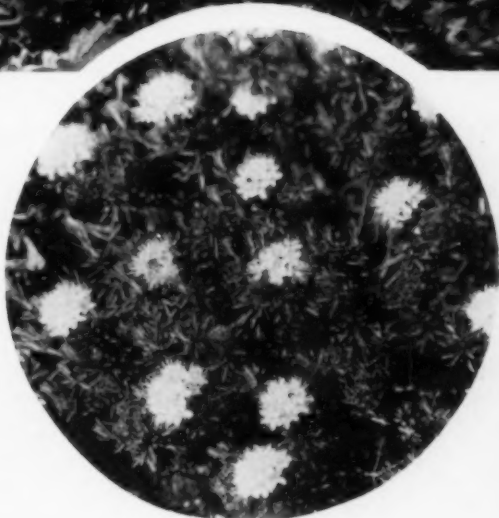
Below:—*Arnica* (*Arnica alpina*) adds its touch of gold to the landscape.



Centre right:—Three-toothed Saxifrages (*Lep-
tasea tricuspidata*) take root in the crevices of the
rocks.

Bottom right:—Labrador Tea (*Ledum decumbens*)
is a truly ornamental shrub.

Below:—Arctic Willows (*Salix anglorum*). These
dwarfs shelter many nesting birds.





Left:—*Franklin's Lady Slipper* (*Cypripedium passerinum*), named in honour of the great explorer. Centre:—*Northern Bog Orchis* (*Lysellia obtusata*)—a quaint little member of the Orchid family. Right:—*Baked Apple Berry* (*Rubus Chamaemorus*)

Sea Glasswort (*Glauz maritima*); Vernal Sandwort (*Sabulina propinqua*), which in the heat of the summer is covered with a foam of dainty white flowers; several varieties of Lousewort, the most showy of which is the Red-tipped (*Pedicularis flammea*); Moonwort (*Botrychium lunaria*); Long-stalked Stitchwort (*Alsine longipes*); the exquisite Marsh Felwort (*Pleurogyne rotata*); Golden Ragwort (*Senecio aureus*); and Marsh Ragwort (*Senecio palustris*), which spreads a golden mantle over acres of damp ground around the sloughs.

Ragwort is only one of the many flowers that add a touch of gold to the northern landscape. The Sub-Arctic has its Marigolds (*Caltha palustris*) and Buttercups (*Ranunculus acris* and *R. Purshii*); its Golden-rod (*Senecio multiradiata*) and Arnica (*Ar-*

nica alpina). It has also Yellow Watercresses (*Rorippa sinuata*), and several of the yellow Cinquefoils; one of these, Goose Tansy (*Argentina Anserina*), grows lushly in damp places and opens blossoms like small golden roses.

But the most exquisite yellow flower of all this district is the Yellow Marsh Saxifrage (*Leptasea Hirculus*) that grows in clusters in the bogs. Each flower is a tiny chalice of pure gold. Others of the saxifrages, which have the fabled power of being able to break rocks, are common. Especially attractive is the Three-toothed (*Leptasea tricuspidata*); it rambles over the rocks, taking root in their crevices and covering them with billows of airy white flowers.

Of more than passing interest are the Willows (*Salix anglorum* and *S. arctophylla* and the Net-veined, *Salix reticulata*). These sturdy little dwarfs squat low to the ground, yet, small as they are, they bear full-sized catkins. They shelter many nesting birds, and their buds and seeds form an important part of the winter food-supply of the ptarmigan.

One cannot see the great fields of Labrador Tea (*Ledum groenlandicum*) that Nature has spread so lavishly all across our north country without feeling that it must have some real value. As yet, little is attributed to it. Some plant lover may discover that

Rose-coloured blossoms of the Arctic Raspberry (*Rubus arcticus*) develop into a delicious fruit.



it contains a valuable dye or rare drug. Who knows? The Narrow-leaved plant (*Ledum decumbens*) is most ornamental when loaded with its clusters of delicate white flowers, but few people have had any real success in cultivating it apart from its native habitat.

Sir John Franklin, in his *Journey to the Polar Seas, 1819-1822*, tells of having made a beverage from the leaves of Labrador Tea which was "most refreshing" and "smelled like rhubarb". Of a later occasion, when he and his party had almost perished for lack of food, he wrote: "We drank an infusion of the Labrador Tea plant and ate a few morsels of burnt leather for supper".

Named in honour of this great explorer of our Canadian Northland is Franklin's Lady Slipper (*Cypripedium passerinum*). This lovely little white orchid dotted with purple is common all through the North. It was first collected by Dr. Richardson, one of Franklin's party. Because of its supposed resemblance to a sparrow's egg, it has been named "passerinum", sparrow-like. Other members of the orchid family found here are the Leafy Green Orchid (*Limnorchis huronensis*), the very interesting Small Northern Bog Orchis (*Lysellia obtusata*), and the hardy *Orchis rotundifolia* with its lovely rose and purple flower.

In this wind-swept district, the Gooseberry (*Grossularia oxycanthoides*) does not grow upright as a shrub, but spreads its



In late summer Cotton-grasses (*Eriophorum angustifolium*) dominate the landscape.

branches flat along the ground. Its excellent fruit is a boon to those who make their home here, as is also that of the Blueberry (*Vaccinium uliginosum*). But by far the most abundant fruit is the Cranberry (*Vitis-Idaea punctata*). Literally tons of these cranberries annually lie untouched. They are small but of delicious flavour and are high in vitamin content. No doubt the day will soon come when, as the result of agricultural research, a larger, and thus more readily marketable, cranberry will be cultivated in this latitude.

Another edible fruit here is the Arctic Raspberry (*Rubus arcticus*), which grows on a low plant. Abundant too is the Baked Apple Berry (*Rubus Chamaemorus*), a native of the northern tundra the world round. This is a species of raspberry which grows

Left:—In late summer the leaves of Dock (*Rumex mexicanus*) take on a bright red hue. Centre:—Northern Strawberry (*Fragaria canadensis*) puts forth a brave show of blossoms. Right:—Arctic mushrooms





*Lush sea-weed on the shore of
Hudson Bay at Churchill*

on a creeping plant with leaves shaped much like those of a maple. Its pretty five-petalled blossom is white, while that of the Arctic Raspberry is a deep rose colour. The Northern Strawberry (*Fragaria canadensis*) puts forth a brave show of blossoms in the spring-time, but it is only in very sheltered spots that its fruit actually comes to maturity.

As a source of food for the fruit-eating birds that nest here, there is also Crowberry (*Empetrum nigrum*), Bearberry (*Arctous erythrocarpa*), and the Low Buffalo Berry (*Shepherdia canadensis*).

Toward the end of the summer, when its leaves have turned a bright red colour, Narrow-leaved Dock (*Rumex mexicanus*) and the Cotton-grasses (*Eriophorum angustifolium*, and *E. callitrix*), waving their plumes of white down, dominate the landscape. At this time, too, most of the sedges, rushes, and grasses are at their best and add greatly to the interest of any one botanizing in the Churchill district.

One might write also of the mosses and mushrooms, of the sea-weed along the coast, and of the many water-plants growing in the sloughs of this district, but each of these would make a story in itself.

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EDITOR'S NOTE BOOK

Born at Lachute, to which her family had come as pioneers nearly a century and a quarter ago, Eva Bradford Beckett is a graduate of Lachute Academy and MacDonald College, Quebec. Mrs. Beckett has spent a number of summers with her husband at Churchill, Manitoba, studying the shore-birds and wild flowers; last year she collected 153 specimens of the latter within a radius of about a mile from her cottage, two or three of which had not previously been recorded for Manitoba. Our readers will appreciate the writer's skilled camera studies of some of these flowers in their native habitat. (See also C.G.J. for March 1941).

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Arthur Gaunt of Bradford, England, will by now be well known to readers of our

Journal for his excellent illustrated articles on English topography which have appeared in previous issues (January and May 1944, and January and February 1945). A Fellow of The Royal Geographical Society and a recently-elected Member of The Institute of Journalists, Mr. Gaunt has a large number of articles and three novels to his credit.

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Arthur L. Neal—See C. G. J. for March (biographical sketch) and May 1945.

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J. Lewis Robinson—See C. G. J. for February, March (biographical sketch) and July 1945.

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Lawrence J. Burpee—See C. G. J. for April (biographical sketch), May, and July 1945.